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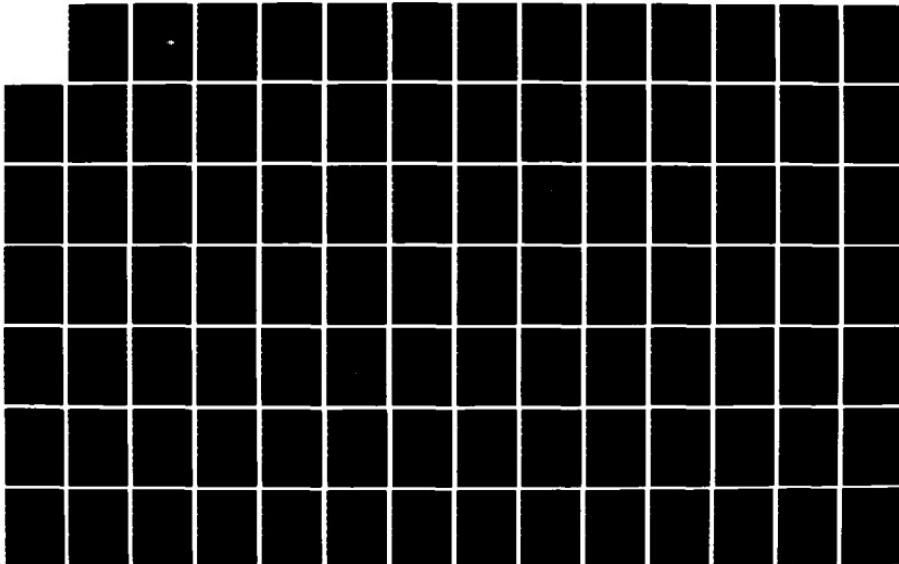
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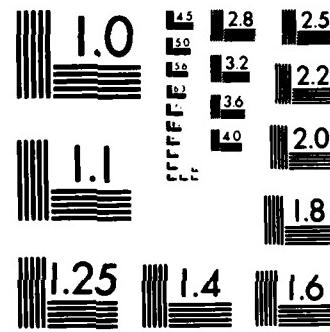
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# AIR FORCE OFFICE OF SCIENTIFIC RESEARCH

AD-A150 860

## Air Force Systems Command

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### TECHNICAL REPORT SUMMARIES



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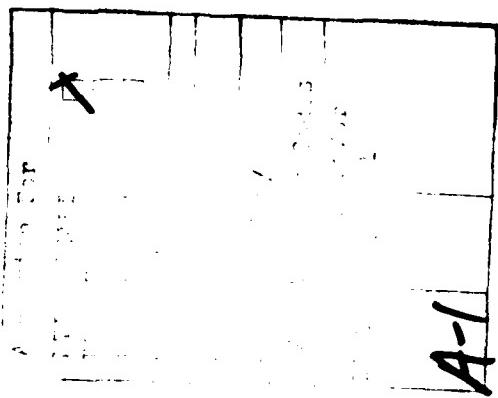
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**TECHNICAL REPORT SUMMARIES**

**FOURTH QUARTER (CY)**



**A-1**



**PREPARED BY:**

**BARBARA WERT, CHIEF  
TECHNICAL DOCUMENTS SECTION**

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## INTRODUCTION

The Air Force Office of Scientific Research Technical Report Summaries are published quarterly as of March, June, September, and December of each calendar year. They consist of a brief summary of each AFOSR technical report received in the Technical Information Division and submitted to the Defense Technical Information Center (DTIC) for that quarter. The summaries contain two indexes for easily locating the technical reports that may be of interest to the user. These are followed by abstracts of the reports.

### 1) SUBJECT INDEX

- a. Subject Field
- b. Title of Report
- c. AD Number (Accession Number)

### 2) PERSONAL AUTHOR INDEX

- a. Primary Author
- b. Title of Report
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## PURPOSE

The purpose of this report is to inform Air Force Laboratories about the science that the Air Force Office of Scientific Research is supporting.

X

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The Air Force Office of Scientific Research (AFOSR) is the Single Manager of the Air Force Defense Research Sciences Program (Program Element 61102F) and the primary Air Force agency for the extramural support of fundamental scientific research. The AFOSR is organizationally under the DCS/Science and Technology, Air Force Systems Command.

AFOSR awards grants and contracts for research in areas of science relevant to the needs of the Air Force. Research is selected for support from unsolicited proposals originating from scientists investigating problems involving the search for new knowledge and the expansion of scientific principles. Selection is on the basis of scientific potential for improving Air Force operational capabilities, originality, significance to science, the qualification of the principal investigators, and the reasonableness of the proposed budget.

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The summaries consist of two indexes and the abstracts. From one of the two indexes, locate the AD number of the report that is of interest to you. Use this number to locate the abstract of the report in the abstracts section. The first report submitted to DTIC during the quarter (the one with the lowest AD number) appears on the last page of the abstracts section. The last report submitted to DTIC during the quarter (the one with the highest DTIC number) appears on the first page of the abstracts section. The following terms will give you a brief description of the elements used in each summary of this report.

**DTIC Report Bibliography** - DTIC's brief description of a technical report.

**Search Control Number** - A number assigned by DTIC at the time a bibliography is printed.

**AD Number** - A number assigned to each technical report when received by the DTIC.

**Field & Group Numbers** - (appearing after the AD number) First number is the subject field and the second number after the slash is the particular group under that subject field.

**Corporate Author/Performing Organization** - The organization; e.g., college/university, company, etc., at which the research is conducted.

**Title** - The title of the technical report.

**Descriptive Note** - Gives the type of report; e.g., final, interim, etc., and the period of the time of the research.

**Date** - Date of the technical report.

**Pages** - Total number of pages contained in the technical report.

**Personal Author** - Person or persons who wrote the report.

**Contract/Grant Number** - The instrument control number identifying the contracting activity and funding year under which the research is initiated.

**Project Number** - A number unique to a particular area of science; e.g., 2304 is the project number for mathematics.

**Task Number** - An alphanumeric number unique to a specific field of the main area of science; e.g., 2304 is the project number for mathematics and A3 is the task number for computational sciences.

**Monitor Number** - The number assigned to a particular report by the government agency monitoring the research. The number consists of the government monitor acronym, the present calendar year and the technical report assigned consecutively; e.g., AFOSR-TR-83-0001 is the first number used for the first technical report processed for Calendar Year 1983.

**Supplementary Note** - A variety of statements pertaining to a report. For example, if the report is a journal article, the supplementary note might give you the journal citation, which will include the name of the journal the article it appears in, and the volume number, date, and the page numbers of the journal.

**Abstract** - A brief summary describing the research of the report.

**Descriptors** - Key words describing the research.

**Identifiers** - Commonly used designators, such as names of equipment, names of projects or acronyms, the AFOSR project and task number, and the Air Force Research Program Element number.

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## **ABSTRACTS**

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CALIFORNIA UNIV LOS ANGELES SCHOOL OF ENGINEERING AND  
APPLIED SCIENCE  
(U) Preparation and Properties of Halide Glasses and Glass-  
Polymer Composites.

DESCRIPTIVE NOTE: Final technical rept. 1 Oct 82-30 Sep  
83.

SEP 83 23P

PERSONAL AUTHORS: Mackenzie, J. D. :

CONTRACT NO. F48602-83-K-0003

PROJECT NO. 2303

TASK NO. A3

MONITOR: AFOSR  
TR-84-0892

## UNCLASSIFIED REPORT

Distribution limited to U.S. Gov't. agencies only; Test  
and Evaluation; 28 Sep 84. Other requests must be  
referred to Air Force Office of Scientific Research, Attn:  
X01D, Bldg. 410, Bolling AFB, DC 20332.

ABSTRACT: (U) Research has been carried out on two  
families of solids. The first one involves fluorides,  
chloride and bromide glasses. The second one involves  
microporous silica glass and gels impregnated with  
organic polymers as well as inorganic crystals. The  
viscosity, vibrational spectra, chemical durability,  
fiber preparation and effects on oxygen on the properties  
of fluoroirconates have been studied. A number of new  
halide glasses were prepared. Microporous silica glass  
impregnated with PMA was found to be highly transparent  
in the visible and possesses abnormal properties. Many  
crystals impregnated into silica glass were found to have  
their melting points depressed and some crystallographic  
transitions were also suppressed. (Author)

DESCRIPTORS: (U) \*Composite materials, \*Glass, \*Polymers,  
\*Halides, Porous materials, Fluorides, Zirconates,  
Crystals, Chlorides, Bromides, Silica glass, Impregnation,  
Crystallization, Viscosity, Vibrational spectra, Chemical  
properties, Endurance(General), Fibers, Preparation,

AD-8087 004L

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SRI INTERNATIONAL MENLO PARK CA

(U) Synthesis of Liquid Crystalline, Extended-Chain Polymer Compositions in Poly(Phosphoric Acid).

DESCRIPTIVE NOTE: Final rept. 15 Nov 80-14 Nov 82.

MAY 83 38P

PERSONAL AUTHORS: Wolfe, J. F. ;Sybert, P. D. ;

CONTRACT NO. F49620-81-K-0003

PROJECT NO. 2303

TASK NO. A3

MONITOR: AFOSR

TR-83-1124

UNCLASSIFIED REPORT

Distribution limited to DoD only; Specific Authority: 3 Oct 84. Other requests must be referred to Air Force Office of Scientific Research/XQT, Building 410, Bolling AFB, Washington, DC 20332.

ABSTRACT: (U) A general synthesis procedure is described for preparing liquid-crystalline compositions that contain poly(phosphoric acid) and aromatic, heterocyclic, extended chain homopolymers, random copolymers, or block copolymers. The polymers are characterized by rigid or semi-rigid molecular structures having benzothiazole, benzobisoxazole, benzoxazole, benzothiazole, benzimidazole, or benzimidazole units in the main chain.

DESCRIPTORS: (U) \*Synthesis (Chemistry). Liquid crystals. Polymers. Benzoxazoles. Phosphoric acids. Benzimidazoles. Block copolymers. Molecular structure. Chains. Semirigid

IDENTIFIERS: (U) Benzothiazoles. LPN-PYU-2485. PE01102F

SEARCH CONTROL NO. EVI19B

AD-8088 251L 18/3 9/6 8/11

WOODWARD-CLYDE CONSULTANTS PASADENA CA

(U) An Attenuation Bias Measurement for the Semipalatinsk Test Site from Multiple S Phases.

DESCRIPTIVE NOTE: Semi-annual technical rept. 15 Dec 83-15 Jun 84.

AUG 84 59P

PERSONAL AUTHORS: Grand, S. ;Heinberger, D. V. ;Burdick, L. J. ;

REPORT NO. WCCP-R-84-06

CONTRACT NO. F49620-83-C-0030, ARPA Order-4493

MONITOR: AFOSR  
TR-84-1084

UNCLASSIFIED REPORT

Distribution limited to U.S. Gov't. agencies only; Test and Evaluation; 2 Oct 84. Other requests must be referred to DARPA/TIO, 1400 Wilson Blvd., Arlington, VA 22208.

ABSTRACT: (U) One of the fundamental problems in monitoring nuclear explosion treatises is the accurate estimation of yield on the basis of seismic data. Absorption along the raypath is one of the most significant factors to be accounted for in interpreting the data. This factor is particularly difficult to treat because body wave attenuation exhibits substantial lateral variation. This means that though we may be able to measure Q in some regions of the world using locally recorded data, we cannot necessarily extrapolate our results to foreign test sites. Recently, we have made some progress in remote sensing by using the multi-bounce phase SS to estimate Q beneath these foreign sites. This technique was applied to the Kazakh region, resulting in estimates of t sub alpha bias similar to those expected for a stable shield, namely delta t sub alpha = 0.2 sec.

DESCRIPTORS: (U) \*Nuclear explosion detection.  
\*Telemetering data. \*Seismic data. Yield/Nuclear explosions. Wave propagation. Ray tracing. Remote areas. Bias. Test facilities. Site selection. Site selection. Southeast Asia. Earth mantle

AD-8088 985L

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AD-8088 251L

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AD-BOB8 251L CONTINUED

IDENTIFIERS: (U) \*Semipalatinsk site, Kazakh region

NORTH CAROLINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC PROCESSES

(U) The Symmetry Group and Exponents of Operator Stable Probability Measures.

DESCRIPTIVE NOTE: Technical rept..

AUG 84 17P

PERSONAL AUTHORS: Hudson, W. N. ; Jurek, Z. J. ; Veech, J. A. ;

REPORT NO. TR-72

CONTRACT NO. F49620-82-C-0009

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR  
TR-84-0916

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Tufts Univ., Medford, MA. Dept. of Mathematics and Auburn Univ., AL. Dept. of Mathematics.

ABSTRACT: (U) There exists exponents of an operator stable measure which commute with every operator in the measure's symmetry group. These exponents together with a new norm lead to some simplifications in the representation of the Levy measure. (Author)

DESCRIPTORS: (U) \*Stochastic processes, Probability, Operators(Mathematics), Multivariate analysis, Vector spaces, Theorems

IDENTIFIERS: (U) Operator stable measure, PEG1102F.  
WUAFOSR2304A5

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## DTIC REPORT BIBLIOGRAPHY

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CALIFORNIA UNIV SANTA CRUZ DEPT OF MATHEMATICS

(U) Dynamical Characteristics of Weak Turbulence.

DESCRIPTION NOTE: Annual interim technical rept. 1 Apr 83-  
31 Mar 84.

AUG 84

16P

PERSONAL AUTHORS: Guckenheimer, J. ;

CONTRACT NO. AFOSR-83-0143

PROJECT NO. 2304

TASK NO. A4

MONITOR: AFOSR  
TR-84-0914

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) This project is an exploration of dynamical features of chaotic physical systems with the emphasis upon turbulent fluids. The specific areas of investigation involve (1) the development of techniques that discriminate measurable differences in the observed behavior of theoretical models for chaotic behavior, (2) the application of these techniques to experimental studies, and (3) the study of bifurcation behavior in multiparameter families of differential equations. The transition to chaotic behavior in fluids has received intense experimental study during the past ten years. Various routes to chaos have been studied, and a satisfying picture has emerged of how this transition proceeds in low dimensional dynamical systems. Our primary interest is in the behavior of a system after it has undergone the transition. Of central concern is the question of determining when low dimensional chaotic models provide a good description of the physical system.

**DESCRIPTORS:** (U) \*Differential equations, \*Turbulence, \*Fluids, Transitions, Parameters, Models, Theory, Dynamics

IDENTIFIERS: (U) PE01102F, MUAFOSR2304A4

## DTIC REPORT BIBLIOGRAPHY

AD-A147 177

14/2

NEW MEXICO UNIV ALBUQUERQUE BUREAU OF ENGINEERING RESEARCH

(U) A General Theory of Circuit Analogy in Fracture Diagnosis.

DESCRIPTION NOTE: Interim rept. 15 Feb 83-15 Feb 84,

MAR 84

77P

PERSONAL AUTHORS: Akgun, M. ; Ju, F. D. ; Paez, T. L. ;

REPORT NO. ME124(84)AFOSR-993-1

CONTRACT NO. AFOSR-81-0086

PROJECT NO. 2307

TASK NO. C2

MONITOR: AFOSR  
TR-84-0910

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) The present report develops electrical analogs to investigate multiple cracks on simple beams and more complex frame structures. Analog networks provide the economic tool to analyze such structures. The effect of multiple cracks on the natural frequencies of simple structures is studied in detail. It is shown that closely spaced multiple cracks are indistinguishable from an effective single crack. A severe crack on a structure can be identified if there are only minor cracks in addition to the major one. If, on the other hand, there is more than one severe crack, then the damage cannot, in general, be diagnosed with only three frequencies measurable. Nevertheless, a minimum number of cracks which are likely to be present in the structure can be established. Characteristic equations are developed in the form of linear systems for cantilever beam and general frame structures with multiple cracks. Usefulness of relative-frequency-change curves are demonstrated and rough guidelines are provided to aid the damage diagnosis process. Several numerical examples are included which illustrate the effect of multiple cracks on frequencies. (Author)

**DESCRIPTORS:** (U) \*Diagnostic equipment, \*Analog systems,

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\*Circuits, \*Cracks, Diagnosis(General),  
Fracture(Mechanics), Frames, Structures, Damage,  
Electrical properties, Linear systems  
IDENTIFIERS: (U) WUAFOSR2307C2, PEG1102F

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SEARCH CONTROL NO. EVI19B

AD-A147 164 20/5

NEW YORK UNIV NY DEPT OF CHEMISTRY

(U) Pulsed Laser Spectroscopic Study of the  
Photolateralization of Azo Labels at Three Different  
Locations on a Polystyrene Chain.

84 7P

PERSONAL AUTHORS: Sung,C. S. P.; Gould,I. R.; Turro,N. J.

CONTRACT NO. AFOSR-81-0013, NSF-DMR82-05897

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR  
TR-84-0893

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Macromolecules. v17 n8 p1447-  
1451 1984.

Reprint: Pulsed Laser Spectroscopic Study of the  
Photolateralization of Azo Labels at Three Different  
Locations on a Polystyrene Chain.

DESCRIPTORS: (U) \*Pulsed lasers, \*Spectroscopy,  
Photochemical reactions, Isomerization, Labels,  
Azobenzenes, Reprints

IDENTIFIERS: (U) PEG1102F, WUAFOSR2307B2

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AD-A147 153      7/2      ORIC REPORT BIBLIOGRAPHY      SEARCH CONTROL NO. EVI19B  
 BRISTOL UNIV (ENGLAND) DEPT OF INORGANIC CHEMISTRY      COLUMBIA UNIV NEW YORK DEPT OF CHEMISTRY  
 (U) **Synthesis and Molecular Structure of (Au3Ru4(Ni<sub>3</sub>H)(CO)<sub>12</sub>(PPh<sub>3</sub>)<sub>3</sub>).**      (U) **Methyl Salicylate Fluorescence as a Probe of the Geometry of Complexation to Cyclodextrins.**

84	SP	84	SP
PERSONAL AUTHORS:	Howard, J. A. K. ; Slater, I. D. ; Gordon, F. ; Stone, A. ;	PERSONAL AUTHORS:	Cox, G. S. ; Turro, N. J. ;
CONTRACT NO.	AFOSR-82-0070	CONTRACT NO.	AFOSR-81-0013
PROJECT NO.	2303	PROJECT NO.	2303
TASK NO.	B2	TASK NO.	B2
MONITOR:	AFOSR	MONITOR:	AFOSR TR-84-0894

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. In Polyhedron, v3 n5 p587-573  
 Reprint: **Synthesis and Molecular Structure of (Au<sub>3</sub>Ru<sub>4</sub>(Ni<sub>3</sub>H)(CO)<sub>12</sub>(PPh<sub>3</sub>)<sub>3</sub>).**

DESCRIPTORS: (U) \*Synthesis(Chemistry), Ruthenium compounds, Carbonyl compounds, Complex compounds, Gold compounds, Molecular structure, Reprints

IDENTIFIERS: (U) PEG1102F, WUAFOSR2303B2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. In Photochemistry and Photobiology, v40 n2 p185-188 1984.  
 Reprint: **Methyl Salicylate Fluorescence as a Probe of the Geometry of Complexation to Cyclodextrins.**

DESCRIPTORS: (U) \*Fluorescence, \*Salicylates, Dextrans, Molecular complexes, Geometry, Dextrans

IDENTIFIERS: (U) \*Methyl salicylates, Cyclodextrins, PEG1102F, WUAFOSR2303B2

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AD-A147 150	21/2	DTIC REPORT BIBLIOGRAPHY	SEARCH CONTROL NO.	EVI 19B
FLORIDA UNIV	GAINESVILLE	DEPT OF CHEMISTRY	AD-A147 148	7/4
(U) Single Pulse Temperature Measurements in Flames by Thermally Assisted Atomic Fluorescence Spectroscopy.			FLORIDA UNIV	GAINESVILLE DEPT OF CHEMISTRY
84	7P	(U) Laser Excited Atomic Fluorescence Spectrometry with Graphite Filament Atomization.	(U)	Laser Excited Atomic Fluorescence Spectrometry with Graphite Filament Atomization.
PERSONAL AUTHORS:	Elder, M. L.; Zizak, G.; Bolton, D.; Horvaths, J. J.; Winefordner, J. D.	PERSONAL AUTHORS:	Wittman, P.; Winefordner, J. D.	:
CONTRACT NO.	F49620-80-C-0005	CONTRACT NO.	F49620-80-C-0005	
PROJECT NO.	2303	PROJECT NO.	F2303	
TASK NO.	A1	TASK NO.	A1	
MONITOR:	AFOSR TR-84-0898	MONITOR:	AFOSR TR-84-0899	
UNCLASSIFIED REPORT				
SUPPLEMENTARY NOTE:		Pub. in Canadian Jnl. of Spectroscopy, v29 n2 p75-78 1984. Abstract in French.		
Reprint: Laser Excited Atomic Fluorescence Spectrometry with Graphite Filament Atomization.				
DESCRIPTORS: (U) *Laser induced fluorescence, *Atomic spectroscopy, *Atomization, Excitation, Microcomputers, Control, Spectrometry, Figure of merit, Precision, Sensitivity, Dynamic range, Detection, Limitations, Sodium, Manganese, Tin, Quantum efficiency, Reprints				
IDENTIFIERS: (U) Thermometry, PEG1102F, WUAFOSR2303A1				
IDENTIFIERS: (U) Laser atomic fluorescence spectrometry, PE61102F, WUAFOSR23003A1				

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SEARCH CONTROL NO. EVI198

AD-A147 143 12/1 9/3 8/1

AD-A147 143 20/1 12/1

ILLINOIS UNIV AT URBANA COORDINATED SCIENCE LAB

(U) Robust Redesign of Adaptive Control ,

MAR 84 11P

PERSONAL AUTHORS: Ioannou, P. A.; Kokotovic, P. V. ;

CONTRACT NO. AFOSR-78-3833

PROJECT NO. 2304

TASK NO. A9

MONITOR: AFOSR TR-84-0866

MONITOR: AFOSR

TR-84-0865

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE Transactions on Automatic Control, VAC-29 n3 p202-211 Mar 84.

Reprint: Robust Redesign of Adaptive Control .

DESCRIPTORS: (U) \*Computations, \*Adaptive control systems, \*Systems engineering, High frequency, Stability, Automatic, Reprints

IDENTIFIERS: (U) Robustness, MUAFOSR2304A9, PEG1102F

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of the Acoustical Society of America, v78 n1 p301-308 Jul 84.

Reprint: Application of the Schur Algorithm to the Inverse Problem for a Layered Acoustic Medium.

DESCRIPTORS: (U) \*Acoustics, \*Plane waves, \*Algorithms, Ocean bottom, Stress strain relations, Angle of arrival, Layers, Pulses, Schrodinger equation, Momentum, Theory, Reprints

IDENTIFIERS: (U) Layered media, Gelfand-Levitan theory, Schur algorithm, Acoustic media, Continuous media, Cholesky recursions, Impulse waves, Point sources, Fast algorithms, Spherical waves, MUAFOSR2304A1, PEG1102F

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DTIC REPORT BIBLIOGRAPHY		SEARCH CONTROL NO. EVI19B		
AD-A147 137	7/4	AD-A147 138	7/5	7/4
OKLAHOMA STATE UNIV STILLWATER DEPT OF CHEMISTRY		CHICAGO UNIV IL JAMES FRANCK INST		
(U) Monte Carlo Transition-State Theory: XH(4) Yields XH(3) + H (X=C,Si).		(U) Relaxation Dynamics of Photoexcited Benzene-Rare Gas van der Waals Complexes.		
JUL 84	GP	AUG 84	21P	
PERSONAL AUTHORS: Viswanathan, R. ;Raff, L. M. ;Thompson, D. L. ;		PERSONAL AUTHORS: Stephenson, T. A. ;Rice, S. A. ;		
CONTRACT NO. AFOSR-82-0311		CONTRACT NO. F49620-83-C-0002		
PROJECT NO. 2303		PROJECT NO. 2303		
TASK NO. A2		TASK NO. B1		
MONITOR: AFOSR TR-84-0857		MONITOR: AFOSR TR-84-0851		
UNCLASSIFIED REPORT				
SUPPLEMENTARY NOTE: Pub. In Jnl. of Chemical Physics, v81 n2 p828-832, 15 Jul 84.				
Reprint: Monte Carlo Transition-State Theory: XH(4) Yields XH(3) H (X=C,Si).				
DESCRIPTORS: (U) *Monte Carlo method, *S11anes, *Methane, Transitions, Theory, Reprints				
IDENTIFIERS: (U) MUAFOSR2303A2, PEB1102F				
UNCLASSIFIED REPORT				
SUPPLEMENTARY NOTE: Pub. In Jnl. of Chemical Physics, v81 n3 p1083-1101, 1 Aug 84.				
Reprint: Relaxation Dynamics of Photoexcited Benzene-Rare Gas van der Waals Complexes.				
DESCRIPTORS: (U) *Photodissociation, *Relaxation, *Benzene, *Rare gases, Molecular vibration, Molecular association, Dynamics, Displacement, Nuclear structure, Atoms, Polyatomic molecules, Interactions, Reaction Kinetics, Constants, Fluorescence, Spectra, Helium, Argon, Neon, Reprints				
IDENTIFIERS: (U) Van der Waals complexes, Van der Waals forces, MUAFOSR2303B1, PEB1102F				

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DTIC REPORT BIBLIOGRAPHY				SEARCH CONTROL NO.	EV19B
AD-A147 130	17/2	9/3	12/1	AD-A147 127	20/4
STANFORD UNIV CA INFORMATION SYSTEMS LAB				MASSACHUSETTS INST OF TECH CAMBRIDGE GAS TURBINE AND PLASMA DYNAMICS LAB	
(U) Studies in Statistical Signal Processing.				(U) Current Problems in Turbomachinery Fluid Dynamics.	
DESCRIPTIVE NOTE: Annual scientific rept. 1 Jul 83-30 Jun 84.				DESCRIPTIVE NOTE: Seml - annual rept. 1 Nov 83-30 Apr 84.	
AUG 84	9P	JUN 84	10BP		
PERSONAL AUTHORS:	Kailath, T. ;	PERSONAL AUTHORS:	Gretzner, E. M.; Kerrebrock, J. L. ; Tompkins, W. T., Jr.; McCune, J. E.; Epstein, A. H. ;		
CONTRACT NO.	AFOSR-83-0228	CONTRACT NO.	F49620-82-K-0002		
PROJECT NO.	2304	PROJECT NO.	2307		
TASK NO.	A6	TASK NO.	A4		
MONITOR:	AFOSR TR-84-0888	MONITOR:	AFOSR TR-84-0859		

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) Several new results in the modeling, analysis and prediction of nonstationary second order processes have been developed. They include (1) the derivation of constant-parameter lattice filters for general nonstationary processes; (2) the development of fast algorithms for adaptive filtering with fixed-order transversal filters, including modifications necessary to ensure stability and convergence with finite precision computations; (3) the invention of a new adaptive beam-forming array for separating coherent (completely correlated) signals and interference. Two Ph.D theses have been completed during this period, H. Lev-Ari, 'Nonstationary Lattice-Filter Modeling', December 1983 and J. M. Cioffi, 'Fast Transversal Filters for Communications Applications', March 1984.

**DESCRIPTORS:** (U) \*Signal processing, Stochastic processes, Adaptive filters, Algorithms, Beam forming, Least squares method

**IDENTIFIERS:** (U) Fast algorithms, Second order processes, PEG102F, MUAFOSR2304A8

**ABSTRACT:** (U) A multi-investigator program on problems of current interest in turbomachinery fluid dynamics is being conducted at the MIT Gas Turbine and Plasma Dynamics Lab. Within the scope of this effort, four different tasks, encompassing both design and off-design problems, have been identified. These are: 1) Investigation of fan and compressor design point fluid dynamics (including formation of design procedures using current three-dimensional transonic codes and development of advanced measurement techniques for use in transonic fans); 2) Studies of basic mechanisms of compressor stability enhancement using compressor casing/hub treatment; 3) Fluid mechanics of inlet vortex flow distortions in gas turbine engines; and 4) Investigations of three-dimensional analytical and numerical computations of flows in highly loaded turbomachinery blading.

**DESCRIPTORS:** (U) \*Transonic flow, \*Axial flow compressors, \*Gas turbines, Mathematical models, Turbomachinery, Fluid dynamics, Numerical methods and procedures, Stability, Vortices, Inlets, Distortion, Three dimensional flow, Fans, Blades, Compressor parts, Hubs, Turbine parts, Pressure distribution, Loads(Forces), Secondary flow, Subsonic flow, Supersonic flow

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IDENTIFIERS: (U) \*Transonic compressors, Heavily loaded compressors, Inverse methods, Compressor casings.  
PE01102F, WUAFOSR2307A4

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI19B

AD-A147 114 4/2 8/6

COLORADO STATE UNIV FORT COLLINS DEPT OF ATMOSPHERIC SCIENCE

(U) Plateau Effects on Diurnal Circulation Patterns.

APR 84 18P

PERSONAL AUTHORS: Reiter, E. R.; Tang, M. ;

CONTRACT NO. DE-AC02-76EV01340, AFOSR-82-0162

PROJECT NO. 2310

TASK NO. A1

MONITOR: AFOSR TR-84-0852

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Monthly Weather Review, v112 n4 p638-651 Apr 84.

Repr Int: Plateau Effects on Diurnal Circulation Patterns.

DESCRIPTORS: (U) \*Convection(Atmospheric), \*Plateaus, \*Diurnal variations, Circulation, Barometric pressure, Thunderstorms, Jet streams, Air flow, Thickness, Earth atmosphere, United States, Reprints

IDENTIFIERS: (U) \*Plateau circulation system, Great Basin, WUAFOSR2310A1, PE01102F

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DTIC REPORT BIBLIOGRAPHY		SEARCH CONTROL NO.
AD-A147 104	9/2	EV19B
MARYLAND UNIV COLLEGE PARK DEPT OF COMPUTER SCIENCE		CONTINUED
(U) Debug Testing and Confidence Testing.		
DESCRIPTIVE NOTE: Technical rept..		
AUG 84	17P	
PERSONAL AUTHORS:	Hamlet, D. ;	
REPORT NO.	CS/E-84-004	
CONTRACT NO.	F49620-80-C-0004	
PROJECT NO.	2304	
TASK NO.	A7	
MONITOR:	AFOSR TR-84-0887	

## UNCLASSIFIED REPORT

ABSTRACT: (U) The strong point of computer program testing has always been failure. When a test fails, it is clear what to do, and this has led to the maximum that the goal of testing is finding faults. Testing theory, on the other hand, has tried to connect test success to program correctness. Call the kind of testing that seeks failures 'debug testing', and the other 'confidence testing'. A confidence-testing technique might in principle be used for debugging, but debugging tools cannot establish confidence. Debug testing is an activity intertwined with the whole of program development, and its theory must take account of this sociological context; debugging is a human craft. On the other hand, confidence testing theory may take program and test as given, without their human origins. Only by separating the two kinds of testing can reasonable goals be set for testing theory. The difference between debug- and confidence-testing theory is illustrated by detailed analysis of partition testing, and of experiments to validate debugging test tools. Goals for each kind of theory are proposed. Originator-supplied keywords include: Nose-rubbing effect, and probabilistic correctness.

DESCRIPTORS: (U) \*Computer programs, \*Confidence level,  
\*Debugging(Computers), Error analysis, Test methods

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DTIC REPORT BIBLIOGRAPHY	SEARCH CONTROL NO.	EVI19B
AD-A147 101      7/3	AD-A147 092	20/4      1/3
CALIFORNIA UNIV LOS ANGELES DEPT OF CHEMISTRY AND BIOCHEMISTRY	TENNESSEE UNIV SPACE INST AND MECHANICAL ENGINEERING	TULLAHOMA DEPT OF AEROSPACE
(U) Structural and Synthetic Organosilicon Chemistry.	(U) Contamination and Distortion of Steady Flow Field Induced by Discrete Frequency in Aircraft Gas Turbines.	
DESCRIPTIVE NOTE: Final rept. 30 Jun 81-29 Jun 84.	DESCRIPTIVE NOTE:	Annual rept. 1 Jan-31 Dec 83.
JUL 84      16P	MAY 84      20P	
PERSONAL AUTHORS: Jung, M. E. ;	PERSONAL AUTHORS:	Kurosaka, M. ;
CONTRACT NO. AFOSR-81-0185	CONTRACT NO.	AFOSR-83-0049
PROJECT NO. 2303	PROJECT NO.	2307
TASK NO. B2	TASK NO.	A4
MONITOR: AFOSR TR-81-0858	MONITOR:	AFOSR TR-84-0808

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) The use of organosilicon compounds in synthesis is described. In particular the use of trimethylsilyl iodide, silyloxydienes, and vinyl iodides are highlighted. Several structural organosilicon studies are also described. (Author)

**DESCRIPTIONS:** (U) \*Silicon compounds, \*Organic compounds, \*Synthesis(Chemistry), \*Analytical chemistry, Chemical bonds, Methyl radicals, Iodides, Oxygen, Dienes, Vinyl radicals, Low temperature, Aldehydes, Condensation, Alkylation, Stereochimistry, Iodination, Hydrzones, Addition reactions, Hybridization, Reactivities, Resistance

**IDENTIFIERS:** (U) WUAFOSR2303B2, PEB1102F

**DESCRIPTORS:** (U) \*Steady flow, \*Flow fields, \*Aircraft engines, \*Gas turbines, Contamination, Distortion, Reynolds number, Stresses, Anechoic chambers, Wind tunnels, Charts, Air Force research

**IDENTIFIERS:** (U) Rande Hilsch effect, Reynolds stresses, Discrete frequency disturbance. PEB1102F, WUAFOSR2307A4

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AD-A147 085 CONTINUED

PURDUE UNIV LAFAYETTE IN THERMOPHYSICAL PROPERTIES  
RESEARCH LAB(U) Thermophysical Property Testing Using Transient  
Techniques.DESCRIPTIVE NOTE: Final scientific rept. 1 Feb 81-1 May  
84.

JUN 84 52P

PERSONAL AUTHORS: Taylor, R. E. ; Shoemaker, R. L. ; Stark, J.  
A. ; Koshigoe, L. G. ;

REPORT NO. TRPL-408

CONTRACT NO. F49620-81-K-0011

PROJECT NO. 2308

TASK NO. A1

MONITOR: AFOSR

TR-84-0889

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) Transient techniques were applied to the study of energetic materials (AP, HMX, RDX and HTPB) used in solid rocket fuel to carbon/carbon materials used as rocket nozzles. Studies on AP included single crystals, pressed powders and AP/HTPB mixtures. It was found that the conductivity of AP can be considered isotropic, even the orthorhombic phase. The conductivity values for pure AP calculated from the AP/HTPB mixtures were somewhat larger than those measured directly on single crystals due to imperfections in the relatively large single crystals. Conductivity values for Beta HMX obtained on pressed powders are believed to be 20% below those that would be obtained on good single crystals if they were available. Delta phase values are believed representative. Conductivity data useful for modeling AP/binder and HMX/binder fuel from RT to combustion were obtained. Successful techniques for determining in-situ conductivity values for carbon fibers and matrix in c/c composites were developed. The relative roles of the fibers and matrix in c/c subject to transient heat fluxes were delineated. The advantages of off-axis testing were revealed. Diffusivity values corresponding to thermal

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conductivity results could be obtained. The presence of a surface layer in which interconstituent thermal gradients are important and beyond which they are negligible was demonstrated. (Author)

**DESCRIPTORS:** (U) \*Thermophysical properties, \*Solid rocket propellant binders, \*Carbon carbon composites, Specific heat, Diffusivity, Thermal conductivity, HMX, RDX, Ammonium perchlorate, Polybutadiene, Energetic properties, Rocket nozzles, Single crystals, Powders, Mixtures, Isotropism, Carbon fibers, Matrix materials, Transients, Heat flux, Test methods, Solid rocket fuels IDENTIFIERS: (U) HTPB(Hydroxy Terminated Polybutadiene), PEG1102F, WUAFOSR2308A1

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## DTIC REPORT BIBLIOGRAPHY

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## ILLINOIS UNIV AT CHICAGO CIRCLE STATISTICAL LAB

(U) A Complete Characterization of Triply Balanced Matrices with Applications to Survey Sampling.

DESCRIPTIVE NOTE: Technical rept..

AUG 84 14P

PERSONAL AUTHORS: Hedayat, A.; Pesotan, H. ;

REPORT NO. TR-84-5

CONTRACT NO. AFOSR-80-0170

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-84-0870

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Guelph Univ., Ontario Dept. of Mathematics and Statistics.

**ABSTRACT:** (U) R x L tripoly balanced matrices arise in cross validation studies and in estimating the mean square errors of nonlinear statistics in many large scale survey samplings. It is shown that: (1) Any R x L tripoly balanced matrix and an orthogonal array OA(R,L,2,3; lambda) are one and the same object up to a possible notational change of the two symbols of the array to + and - respectively. (2) R is a multiple of 8 and L < or = R/2, and (3) The problem of the construction of R x L tripoly balanced matrices, 3 < or = L < or = R/2, is completely resolved modulo the existence of Hadamard matrices of order R/2. (Author)

**DESCRIPTORS:** (U) \*Matrices(Mathematics), Statistical samples, Statistical processes, Theorems

**IDENTIFIERS:** (U) Tripoly balanced matrices, Hadamard matrices, PEG1102F, MUAFOSR2304AS

AD-A147 083

## DTIC REPORT BIBLIOGRAPHY

AD-A147 081 7/3 11/9

## ROCKWELL INTERNATIONAL CANDGA PARK CA ROCKETDYNE DIV

(U) Reactions of Pentafluorotellurium Hypohalites with Fluoroolefins.

84 11P

PERSONAL AUTHORS: Shack, C.; Christie, K. O. ;

CONTRACT NO. F49620-81-C-0020

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR TR-84-0854

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Fluorine Chemistry. v24 p467-476, 1984.

Repr Int: Reactions of Pentafluorotellurium Hypohalites with Fluoroolefins.

**DESCRIPTORS:** (U) \*Chemical reactions, \*Fluorine compounds, \*Halides, \*Fluoropolymers, \*Olefins in polymers, Tellurium compounds, Hypochlorites, Fluorinated hydrocarbons, Ethylene, Analytical chemistry, Reprints

**IDENTIFIERS:** (U) Hypochlorite/pentatellurium, Tellurium oxide/pentafluoro, Fluoroolefins, Fluorocarbons, PEG1102F, MUAFOSR2303B2

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI19B

AD-A147 080

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ILLINOIS UNIV AT CHICAGO CIRCLE

(U) A Condition for the Validity of Fisher's Inequality.

84

EP

PERSONAL AUTHORS: Kageyama, S. ; Tsuji, T. ;

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PERSONAL AUTHORS:

Tang, M. ; Reiter, E. R. ;

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CONTRACT NO. AFOSR-78-3060

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PROJECT NO. 2304

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI19B

AD-A147 075

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11/9

ROCKWELL INTERNATIONAL CANDIA PARK CA ROCKETDYNE DIV

RONDOU ASSOCIATES INC STONE RIDGE NY

(U) Synthesis of Bis-Pentafluorotelluriumoxide Fluorocarbons.

84 11P

PERSONAL AUTHORS: Schack, C. J.; Christe, K. D.;

CONTRACT NO. F49620-81-C-0020

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR

TR-84-0855 UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Fluorine Chemistry, v26 p19-28 1984.  
Reprint: Synthesis of Bis-Pentafluorotelluriumoxide Fluorocarbons.

DESCRIPTIONS: (U) \*Synthesis (Chemistry). \*Fluorinated hydrocarbons. \*Tellurium compounds. \*Oxides. Olefin Polymers. Tetrafluoroethylene resins. Propenes. Ethylene. Cyclic compounds. Fluoropolymers. Vibrational spectra. Raman spectra. Reprints

IDENTIFIERS: (U) \*Fluorocarbons. Tellurium oxide/bis-pentafluoro. Xenon tellurium oxide/bis-pentafluoro. Fluoroolefins. Xenon compounds. PEB1102F. WUAFOSR2303B2

## UNCLASSIFIED REPORT

DESCRIPTIVE NOTE: Quarterly research and development status rept. no. 7, 1 Apr-31 Jul 84.

JUL 84 7P

PERSONAL AUTHOR(S): Pomroy, P. W.; Sutton, G. H.;

CONTRACT NO. F49620-83-C-0017. ARPA Order-4493

PROJECT NO. 2309

TASK NO. A1

MONITOR: AFOSR  
TR-84-0807

## UNCLASSIFIED REPORT

ABSTRACT: (U) Task A: 1--Evaluate the usefulness of Pg and Lg to estimate yield for Eurasian and Africa events; 2--Investigate possible cause of amplitude variation (i.e. source and recording site geology); and 3--Analyze the regional phases for use in discrimination and yield estimation; Task B: 1--Continue the analysis of data from Wake Island Hydrophone Array in cooperation with personnel at Hawaii Inst. of Geophysics and assist in guiding the operation of the array; 2--Conduct comparative studies of (long-range) oceanic Pn/Sn and continental Lg (Pg) using, especially, data from the Catskill Seismic Array and the Wake Array. In comparison with theoretical seismograms for different source types, focal depth, and velocity structures, and 3--Evaluate the detection capability, also compare them with other high quality continental stations and the DARPA/NORDA MSS; Task C: 1--Install, maintain, and operate high quality three component broad band digital seismographs in the Stone Ridge, NY area, and 2--Development analysis techniques and software to obtain source and propagation path characteristics from broad band three component digital data.

DESCRIPTORS: (U) \*Seismic waves. Discrimination, Yield. Estimates, Wave propagation, Amplitude. Seismic arrays.

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## CONTINUED

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI19B

**IDENTIFIERS:** (U) Geology, Eurasia, Africa, Oceans, Paths, Seismic data  
(U) Continents, PEE1102F, MUAFOSR2308A1

CALIFORNIA UNIV SANTA BARBARA DEPT OF ELECTRICAL AND  
COMPUTER ENGINEERING

(U) Techniques for Vector Quantization.

DESCRIPTIVE NOTE: Final rept. 1 Oct 82-30 Sep 83.

AUG 84 11P

PERSONAL AUTHORS: Gersho, A. ;

CONTRACT NO. AFOSR-82-0008

PROJECT NO. 2304

TASK NO. A6

MONITOR: AFOSR  
TR-84-0897

## UNCLASSIFIED REPORT

ABSTRACT: (U) The second year of AFOSR support at the University of California, Santa Barbara has allowed us to make significant strides in exploring the potential of vector quantization for source coding. Some of this work is described in the attached list of references. Some of the studies were completed, including predictive vector quantization and rate distortion modeling of speech using a composite source model to obtain rate distortion bounds on performance of vector quantization. Particularly important results in the second year include the development of a new family of fast search algorithms for pattern matching and the development of hierarchical vector quantization. Several other promising studies, including compound/lattice coding, were still in progress when the grant terminated. (Author)

DESCRIPTORS: (U) \*Vector analysis, Quantization,  
Algorithms, Distortion, Rates, Coding

IDENTIFIERS: (U) Fast algorithms

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## DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI 19B  
 AD-A147 035 20/10 4/1  
**TEXAS UNIV AT AUSTIN DEPT OF CHEMISTRY**  
 NATIONAL BUREAU OF STANDARDS GAITHERSBURG MD QUANTUM  
 CHEMISTRY GROUP

(U) **MDDO Study of Sn2 Reactions and Related Processes.**  
 84 10P

PERSONAL AUTHORS: Carrion,F. ;Devar,M. J. S. ;  
 CONTRACT NO. F49620-83-C-0024

PROJECT NO. 2303  
 TASK NO. B2

MONITOR: AFOSR TR-84-0805

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. In Jnl. of American Chemical Society. v106 n12 p3531-3538 1984.

Reprint: MDDO Study of Sn2 Reactions and Related Processes.

DESCRIPTORS: (U) \*Reaction kinetics, \*Anions, \*Molecular energy levels, \*Aliphatic compounds, \*Quantum theory, Vapor phases, Activation, Barriers, Solutions (General), Solvation, Chlorides, Methyl radicals, Alkyl radicals, Benzyl radicals, Acetaldehyde, Nucleophilic reactions, Substitution reactions, Reprints

IDENTIFIERS: (U) MDDO(Modified Neglect of Differential Overlap), Allyl radicals, PEG1102F, WUAFOSR23031B2

## DESCRIPTIVE NOTE:

Annual rept. 1 Oct 83-30 Sep 84.  
 SEP 84 15P

PERSONAL AUTHORS: Krauss,M. ;Stevens,W. J. ;

CONTRACT NO. AFOSR-ISA-83-00008

PROJECT NO. 2301

TASK NO. A4

MONITOR: AFOSR TR-84-0800

## UNCLASSIFIED REPORT

ABSTRACT: (U) Relativistic effective potentials have been generated for a number of relevant metals such as iron, neodymium, and uranium and applied to calculations of the oxide electronic states including intermediate coupling calculations of the spin-orbit interaction. (Author)

DESCRIPTORS: (U) \*Quantum chemistry, \*Atmospheric chemistry, \*Metal compounds, \*Oxides, \*Electronic states, Iron oxides, Neodymium compounds, Uranium compounds, Coupling (Interaction), Spin states, Molecular orbitals, Energetic properties, Spectroscopy, Models, Solar radiation, Valence, Cations, Pumping, Vibration, High temperature, Infrared spectra, Absorption spectra

IDENTIFIERS: (U) REP(Relativistic Effective Potentials), PEG1102F, WUAFOSR2301A4

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DTIC REPORT BIBLIOGRAPHY		SEARCH CONTROL NO.	EVI19B
AD-A147 033	9 / 1	20 / 12	AD-A147 032 8 / 1
HOWARD UNIV WASHINGTON DC SOLID STATE LAB		ROYAL NORWEGIAN COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH KJELLER	
(U) Development of Short Gate FET's.		(U) Deployment of a Regional Array in Norway.	
DESCRIPTIVE NOTE: Final rept. Jun 81-Jul 84.		DESCRIPTIVE NOTE: Semi-annual technical rept. 1 Jan-30 Jun 84.	
PERSONAL AUTHORS:	Spencer, M. G. ; Harris, G. L. ; Haynes, R. ;	PERSONAL AUTHORS:	Mykkeltveit, S. ;
CONTRACT NO.	AFOSR-81-0223	CONTRACT NO.	F49620-84-C-0013, ARPA Order-4950
PROJECT NO.	2305	PROJECT NO.	2309
TASK NO.	C1	TASK NO.	A1
MONITOR:	AFOSR TR-84-0833	MONITOR:	AFOSR TR-84-0908

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) The goal of this work was to investigate the performance limit of the standard GaAs FET structure. During the contract period we have constructed an AsCl<sub>3</sub> epitaxial system used to provide buffer layers for our Fet structures, we have developed a submicron lithographic process using deep U.V. techniques and, using these techniques we have produced working .5 micron gate devices. In addition, we have investigated the 'gettering' of substrates as a technique to improve the mobility of ion implanted layers. The result of this experiment showed a correlation between Hall mobilities and gettered substrates. Finally, a investigation of a self aligned source drain structure has commenced and several theoretical studies are reported. (Author)

**DESCRIPTORS:** (U) \*Field effect transistors,  
\*Gates(Circuits), \*Lithography, \*Gallium arsenides,  
\*Epitaxial growth, Structural properties, Schottky barrier devices, Ion implantation, Submicrometer waves, Short range(Distance), Gettering, Molecular beams, Theory, High rate, Buffers, Ion implantation, Hall effect, Q band, Sources, Ultraviolet radiation, Layers, Space charge, Substrates, Chromium, Fabrication

**IDENTIFIERS:** (U) Submicron devices, Arsenic trichloride, Short gates, MB(Epitaxial Beam Epitaxy), Buffer layers, Source structures, Hall mobility, Fabrication speeds, Drain structures, PEG1102F, MUAFOSR2309A1

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SEARCH CONTROL NO. EVI19B

AD-A147 011 8/11 20/14 AD-A147 011 CONTINUED

ROCKWELL INTERNATIONAL THOUSAND OAKS CA SCIENCE CENTER

(U) Nonlinear Wave Propagation Study.

DESCRIPTIVE NOTE: Semi-annual technical rept. no. 2, 1  
DEC 83-31 May 84.

MAY 84 21P

PERSONAL AUTHORS: Tittmann, B. R. ;

REPORT NO. SC5281.05AR

CONTRACT NO. F49620-83-C-0085, DARPA Order-4400

PROJECT NO. 3A10

TASK NO. 03

MONITOR: AFOSR  
TR-84-0878

## UNCLASSIFIED REPORT

ABSTRACT: (U) At the present time there still exists an element of uncertainty regarding the definition of an effective radius, which can be used to separate the nonlinear near-field regime adjacent to an explosion from the linear far-field seismic regime. This report presents results of a study of the response of Westerly granite to sinusoidal loading. The amplitude of transition from linearity to non-linearity can be defined. Results are compared to previous studies. Nonlinear effects were observed in a cylindrical test specimen of Westerly granite which was subjected to both flexural and torsional modes of resonant vibration. Nonlinear effects in shear are observed when the shearing strain exceeds approximately 0.000001. Increasing slightly with increasing effective pressure. Nonlinear effects in flexure are also observed when the extension/compression strain exceeds 0.000001, also increasing very slightly with increasing effective pressure. These transition amplitudes probably represent a lower limit on the amplitude of transition from linear to nonlinear behavior for the primary elastic pulse propagating in the near-field of an explosion. Using these measurements it is not possible to determine whether the nonlinear effects observed in flexure are primarily an extensional or compressional feature. This is a critical issue and in

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DTIC REPORT BIBLIOGRAPHY	SEARCH CONTROL NO.	EV19B		
AD-A147 002      7/2	AD-A146 995	20/8	7/4	7/3
BRISTOL UNIV (ENGLAND) DEPT OF INORGANIC CHEMISTRY	CHICAGO UNIV IL JAMES FRANCK INST			20/10
(U) Replacement of Hydrido-Ligands in Triruthenium Complexes by Triphenylphosphinegold Groups. Crystal Structures of (AuRu <sub>3</sub> -(μ <sub>3</sub> -C <sub>6</sub> H <sub>6</sub> )(CO) <sub>10</sub> (PPh <sub>3</sub> )), (AuRu <sub>3</sub> (μ-H) <sub>2</sub> (μ <sub>3</sub> -C <sub>6</sub> H <sub>6</sub> )(CO) <sub>9</sub> (PPh <sub>3</sub> )), and (Au <sub>3</sub> Ru <sub>3</sub> (μ <sub>3</sub> -C <sub>6</sub> H <sub>6</sub> )(CO) <sub>9</sub> (PPh <sub>3</sub> )) <sub>3</sub> .	(U) Vibrational State Dependence of Radiationless Processes in 1B(2 Micrometers) Benzene.			
83      11P	AUG 84      12P			
PERSONAL AUTHORS: Bateman, L. W.; Green, M.; Head, K. A.; Willis, R. M.; Salter, I. D.	PERSONAL AUTHORS: Stephenson, T. A.; Rice, S. A.			
CONTRACT NO. AFOSR-82-0070	CONTRACT NO. F49620-83-C-0002			
PROJECT NO. 2303	PROJECT NO. 2303			
TASK NO. B2	TASK NO. B1			
MONITOR: AFOSR TR-84-0895	MONITOR: AFOSR TR-84-0850			
UNCLASSIFIED REPORT				
SUPPLEMENTARY NOTE: Pub. In Jnl. of the Chemical Society, Dalton Transactions, p2599-2608 1983.	SUPPLEMENTARY NOTE: Pub. In Jnl. of Chemical Physics, v81 n3 p1073-1082, 1 Aug 84.			
REPRINT: Vibrational State Dependence of Radiationless Processes in 1B(2 Micrometers) Benzene.				
DESCRIPTORS: (U) *Benzene, *Electronic states, *Molecular vibration, Molecular energy levels, Laser induced fluorescence, Supersonic flow, Jet flow, Cooling, Reaction kinetics, Constants, Room temperature, Vapor phases, Decay, Vibrational spectra, Excitation, Quantum chemistry, Yield, Molecule molecule interactions, Reprints	DESCRIPTORS: (U) *Ruthenium compounds, *Complex compounds, *Crystal structure, Phosphine, Carbonyl compounds, Reprints			
IDENTIFIERS: (U) PE81102F, MUAFOSR2303B1	IDENTIFIERS: (U) PE81102F, MUAFOSR2303B2			

AD-A147 002

AD-A148 995

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OTIC REPORT BIBLIOGRAPHY      SEARCH CONTROL NO. EVI19B  
AD-A148 977      12/1      AD-A148 969      12/1

JOHNS HOPKINS UNIV      BALTIMORE MD DEPT OF MATHEMATICAL  
SCIENCES

(U) Combined Nonparametric Inference and State Estimation  
for Mixed Poisson Processes.

84      17P      17P

PERSONAL AUTHORS: Karr, A. F. ;  
PROJECT NO. 2304  
TASK NO. A5  
MONITOR: AFOSR TR-84-0883

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Zeitschrift fuer  
Wahrscheinlichkeitstheorie und Verwandte Gebiete, v68 p81-  
98 1984.

Reprint: Combined Nonparametric Inference and State  
Estimation for Mixed Poisson Processes.

DESCRIPTORS: (U) \*Estimates, \*Poisson density functions,  
Laplace transformation

IDENTIFIERS: (U) Poisson processes, Nonparametric  
estimation, Compact spaces, Mixed poisson processes, Cox  
processes, WUAFOSR2304A5, PEG1102F

ABSTRACT: (U) Sequential Feynman integrals are defined  
for classes of functions on a Hilbert space and on an  
abstract Wiener space. A Cameron-Martin formula is proved  
for analytic and sequential Feynman integrals for two  
classes.

DESCRIPTORS: (U) \*Stochastic processes, Integral  
equations, Hilbert space, Theorems

IDENTIFIERS: (U) Abstract Wiener space, Feynman  
integrals, PEG1102F, WUAFOSR2304A5

AD-A148 977

AD-A148 969

UNCLASSIFIED

NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS  
(U) Analytic and Sequential Feynman Integrals on Abstract  
Wiener and Hilbert Spaces, and A Cameron-Martin  
Formula. Revision.

DESCRIPTIVE NOTE: Technical rept.,

JAN 84 43P

PERSONAL AUTHORS: Kalitaipur, G. ; Kannan, D. ; Karandikar, R.  
L. ;

REPORT NO. TR-53

CONTRACT NO. F49620-82-C-0009

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-84-0883

UNCLASSIFIED REPORT

ABSTRACT: (U) Sequential Feynman integrals are defined  
for classes of functions on a Hilbert space and on an  
abstract Wiener space. A Cameron-Martin formula is proved  
for analytic and sequential Feynman integrals for two  
classes.

DESCRIPTORS: (U) \*Stochastic processes, Integral  
equations, Hilbert space, Theorems

IDENTIFIERS: (U) Abstract Wiener space, Feynman  
integrals, PEG1102F, WUAFOSR2304A5

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## DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI19B

AD-A148 987 20/4 12/1 21/5 AD-A148 964 20/4  
**SCIENTIFIC RESEARCH ASSOCIATES INC GLASTONBURY CT**

(U) Development of a Navier-Stokes Rotor/Stator Analysis.  
**DESCRIPTIVE NOTE:** Annual rept. 21 Jun 83-30 Jun 84.

JUN 84 39P

**PERSONAL AUTHORS:** Shawroth, S. J.; McDonald, H.; Weinberg, B.  
 C.; Roscoe, D. V.

**REPORT NO.** SRA-R84-910004-1

**CONTRACT NO.** F49620-83-C-0119

**PRODUCT NO.** 2307

**TASK NO.** A4

**MONITOR:** AFOSR TR-84-0858

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) An important problem in axial flow turbomachinery is that of flow through a turbine or compressor stage in which interaction occurs between the rotor and the stator. Although several experimental efforts have focused upon this problem, relatively little analysis has been applied to this problem. The present effort applies a Navier-Stokes analysis to the rotor/stator problem. The effort consists of several tasks. These include assessment of an existing Navier-Stokes analysis for time-dependent flows, exploration of appropriate boundary conditions, development of an appropriate coordinate system and a demonstration calculation. The present annual report discusses the time-dependent assessment, exploration of boundary conditions and the coordinate system problem.

**DESCRIPTORS:** (U) \*Axial flow, \*Navier Stokes equations, \*Rotors, \*Stators, Boundary value problems, Time dependence

**IDENTIFIERS:** (U) PEG1102F, MUAFOSR2307A4

AD-A148 984 20/4 12/1 21/5 AD-A148 964 20/4  
**MCDONNELL DOUGLAS CORP LONG BEACH CA**

(U) Some Important Problems in Unsteady Boundary Layers Including Separation. II. Unsteady Boundary Layers Close to the Stagnation Region of Slender Bodies.

**DESCRIPTIVE NOTE:** Annual rept. 15 Mar 83-14 Mar 84.

JUN 84 39P

**PERSONAL AUTHORS:** Cebeci, T.; Stewartson, K.; Schimke, S. W.

**REPORT NO.** MDC-J3527

**CONTRACT NO.** F49620-82-C-0055

**PROJECT NO.** 2307

**TASK NO.** A2

**MONITOR:** AFOSR TR-84-0861

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) The evolution of unsteady boundary layers on the plane of symmetry of a slender prolate spheroid in uniform motion at constant angle of attack after an impulsive start has been studied for the case of prescribed pressure distribution. Calculated results have been obtained for angles of attack ranging from 30 degrees to 50 degrees and show, for example, that the unsteady-state solutions approach the steady-state solutions rapidly on the windward and leeward sides for  $\alpha <$  and  $\alpha_{\text{sub}} c$  (approximately - 41 degrees). This is also so on the windward side for  $\alpha > \alpha_{\text{sub}} c$ . On the leeward side for  $\alpha > \alpha_{\text{sub}} c$ , however, the unsteady boundary layer is initially unseparated but develops a region of reversed flow with increasing time. Subsequently, the streamwise displacement thickness develops a pronounced peak which leads to a singularity of the type observed by van Dommelen and Shen on a circular cylinder started impulsively from rest. (Author)

**DESCRIPTORS:** (U) \*Boundary layer, \*Unsteady flow, Flow separation, Turbulent boundary layer, Helicopter rotors, Rotor blades (Rotary wings), Stagnation, Angle of attack

AD-A148 984

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**AD-A148 964**      **CONTINUED**

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**AD-A148 963**    **12/1**    **9/4**

**CALIFORNIA UNIV BERKELEY**

**IDENTIFIERS:** (U) **Prolate "pheroid.** **PE81102F.**  
**WUAFOSR2307A2**

(U) **A Bayesian Lady Tasting Tea.**

**84**

**26P**

**PERSONAL AUTHORS:** **Lindley, D. V.**

**CONTRACT NO.** **AFOSR-81-0122**

**PROJECT NO.** **2304**

**TASK ND.** **A5**

**MONITOR:** **AFOSR  
TR-84-0921**

**UNCLASSIFIED REPORT**

**SUPPLEMENTARY NOTE:** Pub. In **Proceedings of Anniversary Conference, Statistics: An Appraisal (50th)**, p455-479 1984.

**Reprint: A Bayesian Lady Tasting Tea.**

**DESCRIPTORS:** (U) \*Probability, \*Information theory, Legendre functions, Test methods, Errors, Reprints

**IDENTIFIERS:** (U) **Significance tests, Bayesian analysis, Likelihoods, Prior probabilities, Maximum likelihood, Posterior probabilities, Shannon information.** **PE81102F.**  
**WUAFOSR2307A5**

**UNCLASSIFIED REPORT**

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**AD-A148 963**

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DTIC REPORT BIBLIOGRAPHY			SEARCH CONTROL NO.	EVI19B
AD-A146 962	17/2	9/4	AD-A146 980	9/2 12/1
CALIFORNIA UNIV SANTA BARBARA DEPT OF ELECTRICAL AND COMPUTER ENGINEERING			MASSACHUSETTS UNIV AMHERST DEPT OF ELECTRICAL AND COMPUTER ENGINEERING	
(U) Pitch Synchronous Transform Coding of Speech at 9.6 Kb/s Based on Vector Quantization,			(U) A Multiprocessor Network Suitable for Single-Chip VLSI Implementation.	
MAY 84	SP		84 12P	
PERSONAL AUTHORS:	Shoham, Y. ; Gersho, A. ;		PERSONAL AUTHORS:	Samatham, M. R. ; Pradhan, D. K. ;
CONTRACT NO.	AFOSR-82-0008		CONTRACT NO.	AFOSR-84-0052
PROJECT NO.	2304		PROJECT NO.	2304
TASK NO.	A6		TASK NO.	A6
MONITOR:	AFOSR TR-84-0873		MONITOR:	AFOSR TR-84-0885

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. In IEEE International Conference on Communications, p1179-1182 May 84.

Reprint: Pitch Synchronous Transform Coding of Speech at 9.6 Kb/s Based on Vector Quantization.

DESCRIPTORS: (U) \*Speech, \*Coding, Signal to noise ratio, Segmented, Reprints

IDENTIFIERS: (U) Pitch coding, Synchronous coding, Transform coding, Vector quantization, Burst coding, Pitch coding, Block coding, PEG1102F, WUAFOSR2304A6

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. In IEEE Proceedings of Annual International Symposium on Computer Architecture, p328-337 1984.

Reprint: A Multiprocessor Network Suitable for Single-Chip VLSI Implementation.

DESCRIPTORS: (U) \*Computer architecture, \*Multiprocessors, \*Networks, \*Computations, chips(Electronics), Installation, Algorithms, Air Force research, Reprints

IDENTIFIERS: (U) VLSI(Very Large Scale Integration), PEG1102F, WUAFOSR2304A6

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## DTIC REPORT BIBLIOGRAPHY

AD-A148 942 12/1

CLARKSON COLL OF TECHNOLOGY POTSDAM NY DEPT OF  
MATHEMATICS AND COMPUTER SCIEN(U) On the Inverse Scattering Transform of  
Multidimensional Nonlinear Equations Related to First-  
Order Systems in the Plane.

AUG 84 13P

PERSONAL AUTHORS: Fokas, A. S.; Ablowitz, M. J.

CONTRACT NO. AFOSR-78-3874

PROJECT NO. 2304

TASK NO. A4

MONITOR: AFOSR  
TR-84-0920

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. In Jnl. of Mathematics and  
Physics, v25 n8 p2494-2505 Aug 84.Reprint: On the Inverse Scattering Transform of  
Multidimensional Nonlinear Equations Related to First-  
Order Systems in the Plane.DESCRIPTORS: (U) \*Nonlinear algebraic equations,  
\*Inverse scattering, Problem solving, Boundary value  
problems, Integral equations, Nonlinear differential  
equations, Reprints

IDENTIFIERS: (U) WUAFOSR2304AA, PEB1102F

ABSTRACT: (U) A new adaptive dual control solution is  
presented for the control of a class of multivariable  
input-output systems. Both rapidly varying random  
parameters and constant but unknown parameters are  
included. The new controller modifies the cautious  
control design by numerator and denominator correction  
terms. This controller is shown to depend upon  
sensitivity functions of the expected future cost. A  
scalar example is presented to provide insight into the  
properties of the new dual controller. Monte-Carlo  
simulations are performed which show improvement over the  
cautious controller and the Linear Feedback Dual  
Controller of two previous publications. (Author)

DESCRIPTORS: (U) \*Adaptive control systems,

\*Multivariate analysis, \*Input output devices,  
Sensitivity, Parameters, Algorithms, Monte Carlo method,  
Random variables, Stochastic processes, Computations

IDENTIFIERS: (U) WUAFOSR2304A1, PEB1102F

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AD-A148 941

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## UNCLASSIFIED

## DTIC REPORT BIBLIOGRAPHY

AD-A148 938

14/5

9/4

PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF  
ELECTRICAL ENGINEERING

(U) White-Light Optical Information Processing and  
Holography.

DESCRIPTIVE NOTE: Annual rept. 15 Mar 83-14 Mar 84.

JUN 84

84P

PERSONAL AUTHORS: Yu, F. T. S. ;

CONTRACT NO. AFOSR-83-0140

PROJECT NO. 2305

TASK NO. B1

MONITOR: AFOSR

TR-84-0889

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) Progress has been made on the white-light optical information processing and holography research program. Work was completed on a broad band color image deblurring and this technique was extended to the restoration of 2-D out-of-focused color photographic images. A new technique of white-light density pseudocolor encoder was developed for three primary colors. This white-light pseudocolor encoder is very cost effective and offers a high image resolution, which would be an excellent alternative for the digital counterpart. We have also in this period conducted a measuring technique for the degree of coherence in the Fourier plane of the grating-based white-light signal processor. We have shown that high degrees of coherence is achievable with a signal sampling grating at the input plane. Thus the white-light technique is capable of processing the information in complex amplitude and it is very suitable for color signal processing. In this phase of research we have also studied the effect of coherence due to source encoding, signal sampling and spectral band filtering, as applied to the white-light signal processing.

**DESCRIPTORS:** (U) \*Signal processing, \*Holography, \*Information processing, Image processing, Photographic images, Colors, Coding, Sampling, Band spectra, Optical processing, White light

AD-A148 938

## SEARCH CONTROL NO. EVI19B

AD-A148 929

12/1

CALIFORNIA UNIV SANTA BARBARA DEPT OF ELECTRICAL AND  
COMPUTER ENGINEERING

(U) Fast Search Algorithms for Vector Quantization and  
Pattern Matching.

84

SP

PERSONAL AUTHORS: Cheng, D. Y. ; Gershoff, A. ; Ramamurthy, B. ;

Shoham, Y. ;

CONTRACT NO. AFOSR-82-0008

PROJECT NO. 2304

TASK NO. AS

MONITOR: AFOSR

TR-84-0874

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE, p9. 11. 1-9. 11. 4 1984.

Reprint: Fast Search Algorithms for Vector Quantization and Pattern Matching.

**DESCRIPTORS:** (U) \*Signal processing, \*Matching, \*Algorithms, \*Searching, Pattern recognition, Tables (Data), Minimax technique, Simulation, Reprints

IDENTIFIERS: (U) Vector quantization, Pattern matching.

Fast searching, PEB1102F, WUAFOSR2304A6

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## UNCLASSIFIED

		DTIC REPORT BIBLIOGRAPHY	SEARCH CONTROL NO.	EVI19B
AD-A148 927	12/1		AD-A148 923	9/2
BROWN UNIV	PROVIDENCE RI LEFSCHETZ CENTER FOR DYNAMICAL SYSTEMS	MARYLAND UNIV	COLLEGE PARK DEPT OF COMPUTER SCIENCE	
(U)	Numerical Methods and Approximation and Modeling Problems in Stochastic Control Theory.	(U)	Functional Semantics of Modules.	
DESCRIPTIVE NOTE:	Internal rept. 1 Jan-30 Jun 84.	DESCRIPTIVE NOTE:	Technical rept..	
AUG 84	SP	SEP 84	19P	
PERSONAL AUTHORS:	Fleeting, W. H.; Kushner, H. J.	PERSONAL AUTHORS:	Garnon, J.; Hamlet, D.; Mills, H.	
CONTRACT NO.	AFOSR-81-0116	REPORT NO.	CS/E-84-005	
PROJECT NO.	2304	CONTRACT NO.	F49620-80-C-0004	
TASK NO.	A1	PROJECT NO.	2304	
MONITOR:	AFOSR TR-84-0872	TASK NO.	A7	
		MONITOR:	AFOSR TR-84-0879	

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) Research during this period continued in the following topic areas: (1) Nonlinear filtering; (2) Large deviations problems; (3) Stochastic control of piecewise-deterministic processes; (4) Stochastic variational calculus; (5) Approximating multiple Ito Integrals with band-limited processes; (6) Large deviations methods and asymptotic properties of recursive algorithms; and (7) Approximation and modelling for distributed stochastic systems. Progress is summarized and a list of publications supported by the grant is included in the report. (Author)

**DESCRIPTORS:** (U) \*Numerical methods and procedures, \*Control theory, \*Stochastic control, \*Mathematical models, Approximation(Mathematics), Mathematical filters, Nonlinear systems, Recursive functions, Integrals, Asymptotic series

**IDENTIFIERS:** (U) PEG1102F, WUAFOSR23034A1

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) Because large-scale software development is a struggle against internal program complexity, the modules into which programs are divided play a central role in software engineering. A module encapsulating a data type allows the programmer to ignore both the details of its operations, and of its value representations. It is a primary strength of program proving that as modules divide a program, making it easier to understand so do they divide its proof. Each module can be verified in isolation, then its internal details ignored in a proof of its use. This paper describes proofs of module abstractions based on the functional method of Mills, and contrasts this with the Alphard formalism based on Hoare logic. (Author)

**DESCRIPTORS:** (U) \*Computer programming, \*Modules(Electronics), \*Semantics, Computer programs, Encapsulation, Systems engineering, Value, Computer logic

**IDENTIFIERS:** (U) PEG1102F, WUAFOSR2304A7

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AD-A146 909      20/3      11/3      DTIC REPORT BIBLIOGRAPHY      SEARCH CONTROL NO. EVI19B  
MICROELECTRONICS RESEARCH AND DEVELOPMENT CENTER      AD-A146 909      CONTINUED  
**(U) Research on Electroluminescence in Thin Film Yttrium Oxyulfide.**

DESCRIPTIVE NOTE: Final rept. 1 Jun 81-15 Sep 83.

AUG 84      54P

PERSONAL AUTHORS: Ketchpel, R. D.; Hale, L. G. ;

REPORT NO. MRDC41090.3FR

CONTRACT NO. F49620-81-C-0089

PROJECT NO. 2306

TASK NO. B1

MONITOR: AFOSR  
TR-84-0891

## UNCLASSIFIED REPORT

ABSTRACT: (U) Thin films of a rare-earth oxyulfide phosphor, yttrium oxyulfide:europium, were evaluated for use in a thin film electro-luminescent emitter (TFEL). For the first time, emission typical of the rare earth activator was observed in a rare earth host TFEL emitter. The films were characterized for optical spectrum, brightness-voltage characteristic, photoluminescence, crystal structure, and compared to efficient cathodoluminescent powder phosphors, yttrium oxyulfide: europium, as well as high efficiency TFEL emitters of zinc sulfide:manganese. The E-beam deposited films exhibited considerable photoluminescence and cathodoluminescence after a high temperature anneal (800 C). However, the anneal induced cracks in the phosphor film, which in turn limited the maximum applied voltage and electroluminescent brightness to less than 1 ft-L. Alternate substrate materials and process schedules minimized the cracking, but did not eliminate this fundamental problem.

DESCRIPTORS: (U) \*Electroluminescence, \*Thin films, \*Yttrium compounds, \*Sulfides, Substrates, Voltage, Phosphors, Crystal structure, Annealing, Cracks, Deposition, Rare earth compounds, Emitters

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DTIC REPORT BIBLIOGRAPHY	SEARCH CONTROL NO.	EV119B
AD-A148 894	7/4	7/2
FLORIDA UNIV GAINESVILLE DEPT OF CHEMISTRY		AD-A148 890
(U) Determination of Trace Alkali and Alkaline Earth Metals in Orange Juices Using the DC Plasma and the Inductively Coupled Plasma Atomic Emission Techniques.		9/2
84	11P	5/10
PERSONAL AUTHORS: McHard, J. A. ; Twigg, K. M. ; Bach, D. T. ; Winford, J. D. ;		
CONTRACT NO. F49620-80-C-0005		
PROJECT NO. 2303		
TASK NO. A1		
MONITOR: AFOSR TR-84-0800		

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. In Spectroscopy Letters, v17(4&5) p287-294 1984.

Reprint: Determination of Trace Alkali and Alkaline Earth Metals in Orange Juice Using the DC Plasma and the Inductively Coupled Plasma Atomic Emission Techniques.

DESCRIPTORS: (U) \*Analytical chemistry, \*Plasmas(Physics), \*Spectroscopy, \*Trace elements, \*Alkali metals, \*Alkaline earth metals, Fruit juices, Direct current, Atomic properties, Emission, simulation, Substrates

IDENTIFIERS: (U) Plasma spectroscopy, Inductively coupled plasma, Direct current plasmas, Matrix effects, Atomic emission, Orange juice, PEG1102F, WUAFOSR2303A1

## UNCLASSIFIED REPORT

ABSTRACT: (U) During the year progress was made in a number of directions: (1) The investigators developed in significant detail a language for representing an agent's understanding of aspects of how a device works, and also developed a compiler which can produce a diagnostic expert problem solving system from this deep level functional representation. (2) The researchers continued their investigation of how design knowledge can be organized as plans and design problem solving can be viewed as design refinement by plan selection and redesign. They have completed the construction of a prototype design expert system called AIR-CYL, which designs a moderately complex mechanical component called an air cylinder for a range of specifications. (3) They continued investigation of high-level languages for expert system construction; in particular they have refined their design of the CSRL language for diagnostic expert system, and implemented it in Interlisp for the Xerox family of Lisp machines. (4) They have initiated a new investigation in reasoning about the behavior of physical systems by qualitative simulation by using a novel technique called consolidation, which infers the behavior of a composite component from the behaviors of its subcomponents.

DESCRIPTORS: (U) \*Information processing, \*Information retrieval, \*Problem solving, Systems engineering, High

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**DTIC REPORT BIBLIOGRAPHY**

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AD-A146 868

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level languages. Computer aided diagnosis. Computer aided design. Hierarchies. Artificial intelligence. Reasoning. Behavior. Planning. Selection  
IDENTIFIERS: (U) CSRL(Conceptual Structures Representation Languages). PEG1102F. WUAFOSR2304A7

JOHNS HOPKINS UNIV BALTIMORE MD DEPT OF MATHEMATICAL SCIENCES

(U) Estimation and Reconstruction for Zero-One Markov Processes.

84 38P

PERSONAL AUTHORS: Karr, A. F. ;

CONTRACT NO. AFOSR-82-0029

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR  
TR-84-0884

**UNCLASSIFIED REPORT**

SUPPLEMENTARY NOTE: Pub. In Stochastic Processes and their Applications, v18 p219-255 1984.

Reprint: Estimation and Reconstruction for Zero-One Markov Processes.

DESCRIPTORS: (U) \*Markov processes, Parameters, Estimates, Paths, Computations, Reprints

IDENTIFIERS: (U) PEG1102F, WUAFOSR2304A7

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AD-A146 868

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DTIC REPORT BIBLIOGRAPHY		SEARCH CONTROL NO.
AD-A146 862	12/1	AD-A146 862 CONTINUED
WISCONSIN UNIV-MILWAUKEE DEPT OF PHYSICS		Operators(Mathematics), Polynomials, Symmetry
(U) Lattice Statistics.		IDENTIFIERS: (U) *Lattice statistics, PEG1102F,
DESCRIPTIVE NOTE: Final scientific rept. 1 Jul 83-30 Jun 84.		WUAFOSR23045
AUG 84	13P	
PERSONAL AUTHORS:	McQuistan, R. B. ;	
CONTRACT NO.	AFOSR-81-0192	
PROJECT NO.	2304	
TASK NO.	AS	
MONITOR:	AFOSR TR-84-0880	

## UNCLASSIFIED REPORT

ABSTRACT: (U) The objective of this research was to develop the mathematical formalism necessary to treat a number of unsolved problems in lattice statistics. Toward that end the investigators have considered the following problems: (1) The occupational degeneracy of particles of various shapes on lattice spaces of various dimensionalities and structures. (2) The nearest neighbor degeneracy for various kinds of particles on lattice spaces of various dimensionalities and structures. (3) The k-th neighbor problem for simple particles on a one dimensional, rectangular lattice space. Utilizing set theoretic arguments they have been able to construct shift operator matrices that, in principle, permit them to establish recursion relations that describe exactly the occupational degeneracy for any shape particle on a lattice space of any dimensionality and structure. Similar techniques allow the investigators to determine the composite nearest neighbor degeneracy for simple particles, dumbbells and lambda-bell particles on quasi-two dimensional rectangular lattices. They have utilized the foregoing formalism to treat the thermodynamics (canonical and grand partition functions) for such systems. (Author)

DESCRIPTORS: (U) \*Lattice dynamics, \*Statistical analysis, Problem solving, Crystal lattices, Particles, Shape, Thermodynamics, Matrices(Mathematics).

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI19B

AD-A146 837

12/1

MASSACHUSETTS UNIV AMHERST DEPT OF MATHEMATICS AND  
STATISTICSNORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS  
(U) A Non-Commutative Quasi Subadditive Ergodic Theorem.(U) An Operator Method for Computing the Asymptotics of a  
Collision Resolution Interval.

DESCRIPTIVE NOTE: Technical rept..

AUG 84 20P

AUG 84 15P

PERSONAL AUTHORS: Rosenkrantz, W. A. ;

PERSONAL AUTHORS: Jajte, R. ;

CONTRACT NO. AFOSR-82-0187

REPORT NO. TR-73

PROJECT NO. 2304

CONTRACT NO. F49620-82-C-0009

TASK NO. A5

PROJECT NO. 2304

MONITOR: AFOSR  
TR-84-0919

MONITOR: AFOSR

REPORT NO. A5

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) The investigators present an operator method for obtaining upper and lower bounds for the expected length of a collision resolution interval for various protocols. The method is elementary in that it circumvents the intricate and ingenious complex variable methods of Fayolle, Flajolet and Hofri (1983). It is also noted that the method can be applied to computing upper and lower bounds for the conditional delay. The problem of computing upper and lower bounds for the variances by this method remains open. (Author)

**DESCRIPTORS:** (U) \*Numerical methods and procedures,  
\*Operators (Mathematics), \*Computations, Asymptotic  
normality, Algorithms, Channels, Transmissivity,  
Equations, Variables, Collisions, Intervals, Resolution

**IDENTIFIERS:** (U) \*Collision resolution intervals,  
Protocols, Upper bounds, Lower bounds, PEB1102F,  
WUAFOSR2304AS

## UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI19B

AD-A146 810

12/1

NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS  
(U) A Non-Commutative Quasi Subadditive Ergodic Theorem.

DESCRIPTIVE NOTE: Technical rept..

(U) A Non-Commutative Quasi Subadditive Ergodic Theorem.

AUG 84 15P

PERSONAL AUTHORS: Jajte, R. ;

REPORT NO. TR-73

CONTRACT NO. F49620-82-C-0009

PROJECT NO. 2304

TASK NO. A5

PROJECT NO. 2304

MONITOR: AFOSR

REPORT NO. A5

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) This work is a contribution to the non-commutative pointwise ergodic theory which has been developed recently in a series of papers by a few authors. These authors extended to the van Neumann algebra context the classical Birkhoff's type theorems. This documents main goal is to prove a non-commutative version of a subadditive ergodic theorem.

**DESCRIPTORS:** (U) \*Ergodic processes, \*Theorems, Algebra, Hilbert space, Functions (Mathematics), Convergence, Operators (Mathematics), Banach space, Sequences (Mathematics), Orthogonality

**IDENTIFIERS:** (U) Von Neuman Algebra, PEB1102F,  
WUAFOSR2304AS

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AD-A148 702      17/4      17/2      9/4      DTIC REPORT BIBLIOGRAPHY      SEARCH CONTROL NO. EVI19B  
**CALIFORNIA INST OF TECH PASADENA DEPT OF ELECTRICAL ENGINEERING**  
 CONTRACT NO. AFOSR-83-0298

(U) Coding for Spread-Spectrum Channels in the Presence of Jamming.

DESCRIPTIVE NOTE: Interim rept. 1 Jul 83-30 Jun 84.

83      7P

PERSONAL AUTHORS: Chang, L. F.; McEliece, R. J.;

PROJECT NO. 2304

TASK NO. A8

MONITOR: AFOSR TR-84-0816  
 UNCLASSIFIED REPORT

## UNCLASSIFIED REPORT

ABSTRACT: (U) During this period research progressed in these areas: (1) a thorough analysis of the problems involved in communicating reliably in the presence of hostile jamming, and (2) the design of effective 'anti-jam' (A/J) countermeasures at the systems level. In the short-term, research is presently focused on the detailed mathematical analyses of several specific A/J modulation and coding strategies of the investigator's own design, which are applicable to modern spread-spectrum communication systems. (Author)

DESCRIPTORS: (U) \*Anti jamming, \*Spread spectrum, Information theory, \*Coding, \*Communication equipment, Countermeasures, Mathematical analysis, Channels, Enemy, Strategy

IDENTIFIERS: (U) Viterbi's ratio, Game theory, Channel capacity, Erasures, Algebraic coding, PEG1102F, MUAFOSR2304A8

SUPPLEMENTARY NOTE: Pub. in Linear and Multilinear Algebra, v14 p143-156 1983.

Reprint: On Generalizations of the Perron-Frobenius Theorem.

DESCRIPTORS: (U) \*Theorems, \*Matrices (Mathematics), Eigenvalues, Eigenvectors, Reprints

IDENTIFIERS: (U) \*Perron Frobenius theorem, PEG1102F, MUAFOSR2304A3

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		DTIC REPORT BIBLIOGRAPHY	SEARCH CONTROL NO.
AD-A148 309	12/1	5/3	EV119B AD-A148 278 17/8
FLORIDA UNIV GAINESVILLE		CINCINNATI UNIV OH SOLID STATE ELECTRONICS LAB	
(U) Identifiability and Modeling in Econometrics.			
83	41P	DESCRIPTIVE NOTE:	Interim rept. 15 Mar 83-14 Mar 84.
PERSONAL AUTHORS:	Kalman, R. E. ;	MAY 84	31P
CONTRACT NO.	DAAG29-81-K-0138. DAAG29-77-Q-0225	PERSONAL AUTHORS:	Boyd, J. T. ;
MONITOR:	ARO, AFOSR 18343-7-MA, TR-84-0887	CONTRACT NO.	AFOSR-81-0130
UNCLASSIFIED REPORT			
Availability: Pub. in Developments in Statistics, v4 p97-138 (No copies furnished by DTIC/NTIS).		TASK NO.	B1
SUPPLEMENTARY NOTE: Supported in part by Grant AFOSR-78-3034.		MONITOR:	AFOSR TR-84-0777

Reprint: Identifiability and Modeling in Econometrics.

DESCRIPTORS: (U) \*Mathematical models, \*Econometrics, Parametric analysis, Stochastic processes, Estimates, Time series analysis, Equations, Reprints

UNCLASSIFIED REPORT

ABSTRACT: (U) Progress in several areas regarding the integration of photodetectors with optical waveguide structures is presented. In the area of formation of photodetector arrays on layers of laser-recrystallized polycrystalline silicon, progress has occurred in using antireflection stripes to control the location of grain boundaries. Large areas free of grain boundaries are then available for photodetector fabrication. A 6mm x 5mm test chip containing photodetector arrays, switching MOS transistors, and a number of other test devices has been designed and masks fabricated. This test chip has been fabricated with operation just demonstrated. Detailed testing of this chip is now underway.

DESCRIPTORS: (U) \*Photodetectors, \*Optical waveguides, Antireflection coatings, Stripes, Control, Fabrication, Test equipment, Grain boundaries, Integration, Arrays, Chips(Electronics), Transistors

IDENTIFIERS: (U) PEB1102F, WUAFOSR2305B1

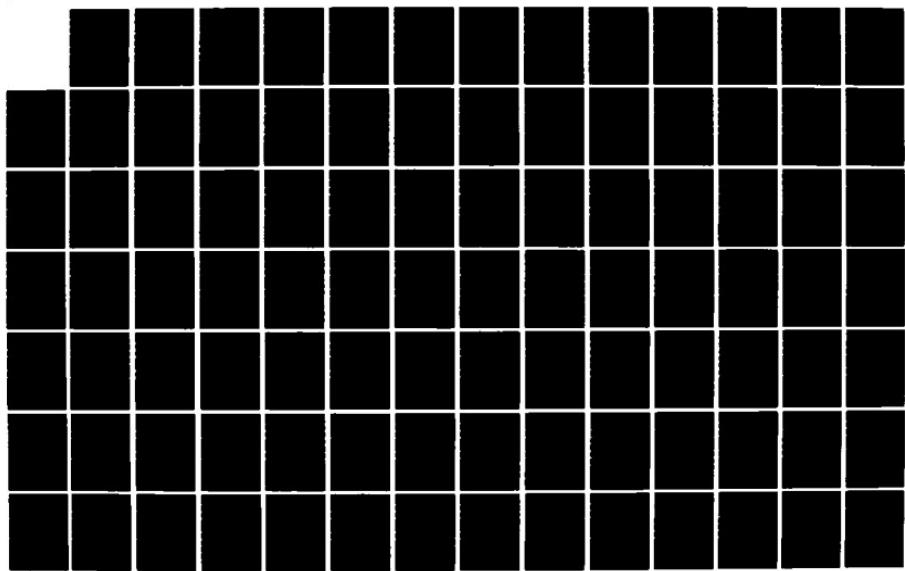
AD-A150 860 AIR FORCE OFFICE OF SCIENTIFIC RESEARCH (AFOSR)  
TECHNICAL REPORT SUMMARY. (U) AIR FORCE OFFICE OF  
SCIENTIFIC RESEARCH BOLLING AFB DC B J WERT JAN 85

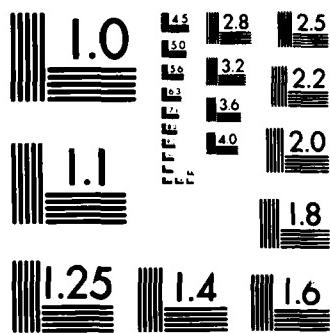
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MICROCOPY RESOLUTION TEST CHART  
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DTIC REPORT BIBLIOGRAPHY		SEARCH CONTROL NO.	EVI19B
AD-A148 277	7/3	AD-A148 268	12/1 20/4
<b>GEORGIA UNIV ATHENS DEPT OF CHEMISTRY</b>			
(U) New Dialkylamino Derivatives of Trivalent Phosphorus.		SCIENCE APPLICATIONS INC PLEASANTON CALIF	
83	SP	(U) Moving Finite Elements in 2-D.	
PERSONAL AUTHOR(S): King, R. B. ; Sadananti, N. D. ; Sundaram, P. M. ;		DESCRIPTIVE NOTE: Final rept. 8 Jun 83-7 Jun 84.	
CONTRACT NO. AFOSR-81-0051		PERSONAL AUTHORS: Galinas, R. J. ;	
PROJECT NO. 2303		REPORT NO. SAI-84/1299	
TASK NO. B2		CONTRACT NO. F49620-81-C-0073	
MONITOR: AFOSR TR-84-0876		PROJECT NO. 2304	
UNCLASSIFIED REPORT		TASK NO. A3	
UNCLASSIFIED REPORT		MONITOR: AFOSR TR-84-0832	
SUPPLEMENTARY NOTE: Pub. In Phosphorus and Sulfur, v18 p125-128 1983.		UNCLASSIFIED REPORT	
Reprint: New Dialkylamino Derivatives of Trivalent Phosphorus.		ABSTRACT: (U) The moving finite element (MFE) method is a new approach for numerically solving partial differential equation (PDE) systems; it is particularly well suited for resolving PDE solutions which have large, multiple gradients over highly disparate both space and time. These types of PDE's abound basic technical disciplines as aerodynamics (with emphasis on shear layers, shocks and their possible interactions), combustion, plasma physics, material interface phenomena, continuum mechanics, and other transport processes.	
DESCRIPTORS: (U) *Phosphorus, *Phosphorus compounds, *Phosphine, Alkyl radicals, Amines, Cyclic compounds, Synthesis (chemistry), Molecular structure, Reprints			
IDENTIFIERS: (U) Dialkylaminophosphines, Cyclotetraphosphines, Phosphine/Bis(Diisopropylamino), PE81102F, WUAFOSR2303B2			

**DESCRIPTORS:** (U) \*Finite element analysis, \*Partial differential equations, \*Boundary layer flow, Grids(Coordinates), Nodes, Linear Systems, Problem solving, Moving targets, Two dimensional flow

**IDENTIFIERS:** (U) MFE(Moving Finite Element), WAFOSR2304A3, PEG102F

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AD-A148 288

REF ID: A6572  
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**DTIC REPORT BIBLIOGRAPHY**

**AD-A146 228**      **12/1**

**CALIFORNIA UNIV SANTA BARBARA INST FOR THE  
INTERDISCIPLINARY APPLICATIONS OF ALGEBRA AND  
COMBINATORICS**

**(U) Multiplicativity of 1 sub p Norms for Matrices. 1.**

**83**

**12P**

**PERSONAL AUTHORS:** Goldberg,M. ;Straus,E. G. ;

**CONTRACT NO.** AFOSR-83-0180

**PROJECT NO.** 2304

**TASK NO.** A3

**MONITOR:** AFOSR  
**TR-84-0781**

**UNCLASSIFIED REPORT**

**SUPPLEMENTARY NOTE:** Pub. In Linear Algebra and Its  
Applications, v52/53 p351-360 1983. See also 2. **AD-A145**  
794.

**Reprint: Multiplicativity of 1 sub p Norms for Matrices.**

**I.**

**DESCRIPTORS:** (U) \*Matrices(Mathematics),  
Operators(Mathematics), Inequalities, Reprints

**IDENTIFIERS:** (U) \*Multiplicativity. MUAFOSR2304A3,  
PE81102F

**DTIC REPORT BIBLIOGRAPHY**

**AD-A146 220**      **5/10**

**MEDICAL RESEARCH INST OF SAN FRANCISCO CA**

**(U) Visual Selective Attention.**

**DESCRIPTIVE NOTE:** Annual scientific rept..

**83**

**4P**

**PERSONAL AUTHORS:** Nakayama,K. ;

**CONTRACT NO.** AFOSR-83-0320

**PROJECT NO.** 2313

**TASK NO.** A5

**MONITOR:** AFOSR  
**TR-84-0774**

**UNCLASSIFIED REPORT**

**ABSTRACT:** (U) This technique has been used to differentially localize neural activity associated with sinusoidal grating onset and offset in different evidence that the field potentials recorded on the surface of the occipital lobe originate in an area other than the primary visual cortex. Because current source density analysis has such great ability to localize the origins of visual evoked potentials, this technique can also be applied to examine the origin of attention-related potentials. It is expected that the results of this study will aid in the interpretation of event-related potentials in humans.

**DESCRIPTORS:** (U) \*Visual cortex, \*Vision,  
Electrophysiology, Test methods, Electrodes, Selection  
**IDENTIFIERS:** (U) Visual evoked potentials. MUAFOSR2313A5,  
PE81102F

**UNCLASSIFIED**

DTIC REPORT BIBLIOGRAPHY      SEARCH CONTROL NO. EVI19B  
AD-A148 210      12/1      AD-A148 191      12/1  
CALIFORNIA UNIV    LOS ANGELES DEPT OF SYSTEM SCIENCE  
(U) Canonical Decompositions of Completely Nonunitary Contractions.

JUL 84      15P

PERSONAL AUTHORS: Levan.N. ;

CONTRACT NO. AFOSR-79-0083

PROJECT NO. 2304

TASK NO. A8

MONITOR: AFOSR  
TR-84-0783

**UNCLASSIFIED REPORT**

SUPPLEMENTARY NOTE: Pub. in Jnl. of Mathematical Analysis  
and Applications. v101 n2 p814-826 Jul 84.

Reprint: Canonical Decompositions of Completely  
Nonunitary Contractions.

DESCRIPTORS: (U) \*Hilbert space, \*Operators(Mathematics),  
Decomposition, Contraction, Reprints

IDENTIFIERS: (U) Isometries, WUAFOSR2304A8, PEE1102F

**UNCLASSIFIED REPORT**

SUPPLEMENTARY NOTE: Pub. in the Annals of Statistics. v12  
n2 p865-874 1984.

Reprint: On the Sinusoidal Limit of Stationary Time  
Series.

DESCRIPTORS: (U) \*Time series analysis, Stationary,  
Theorems, Equations, Reprints

IDENTIFIERS: (U) Sinusoidal limit theorem, Slutsky  
theorem, PEE1102F, WUAFOSR2304A5

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DRIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVI19B

AD-A148 139 11/2 13/2 AD-A146 139 CONTINUED

DREXEL UNIV PHILADELPHIA PA DEPT OF CIVIL ENGINEERING

(U) Materials for Emergency Repair of Runways.

DESCRIPTIVE NOTE: Interim rept. 1 Oct 83-31 Mar 84.

APR 84 148P

PERSONAL AUTHORS: Popovics, S. ;

REPORT NO. 001129-1

CONTRACT NO. AFOSR-83-0245

PROJECT NO. 2307

TASK NO. C2

MONITOR: AFOSR TR-84-0893

UNCLASSIFIED REPORT

ABSTRACT: (U) The purpose of the investigation here was to test four inorganic cementing materials, and screen out from further investigation those that are obviously unsuitable for the fulfillment of the requirements for emergency repair of concrete runways under war conditions. The four materials are SET-45 cold formula; SET-45 hot formula; Aluminum phosphate (AlP) cement; and Jet cement. In addition, a 50/50 blend of the SET-45 cold and hot formulas was investigated, and a portland cement of Type III was tested for the sake of comparison. The SET-45 formulas and the AlP cement are based on magnesium oxide. The Jet cement is a modified portland cement. A combination of mechanical testing and physicochemical examinations was used. The mechanical testing concentrated on the early strength developing capabilities of the cements under room temperature. On this basis the cements of magnesium oxide content, that is the SET-45 cold formulas appear to be the most suitable for the project. For instance, the SET-45 cold formulas can produce compressive strengths in excess of 10,000 psi at the age of 1 hour with low water contents. Even with high water content, enough to produce flowing consistency, the 1-hr strengths are regularly over 3,000 psi. The corresponding setting time of this formula, however, is usually less than 10 minutes even at room temperature. The setting time of SET-45 hot formula is much longer.

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI19B

AD-A148 025 CONTINUED

SRI INTERNATIONAL MENLO PARK CA ARTIFICIAL INTELLIGENCE  
CENTER

(U) Knowledge Representation and Natural-Language  
Semantics.

DESCRIPTIVE NOTE: Annual technical rept. no. 2. 1 Jun 83-  
30 May 84.

JUL 84 1OP

PERSONAL AUTHORS: Moore, R. C. ;

CONTRACT NO. F49620-82-K-0031

MONITOR: AFOSR  
TR-84-0799

## UNCLASSIFIED REPORT

ABSTRACT: (U) Central to almost all aspects and applications of artificial intelligence is the representation and manipulation of large bodies of knowledge about the world. When viewed from the perspective of their ability to express facts about the external world, however, most knowledge representation schemes currently used in artificial intelligence are constrained by the limits of first-order logic. That is, they provide terms for referring to individuals, predicates for expressing properties and relations of individuals, and mechanisms that achieve some of the effects of propositional connectives and quantifiers. Such research effort has been expended on ways of organizing knowledge bases and developing information retrieval mechanisms; in terms of pure expressive power, however, existing representation systems are rather limited. This issue is brought into sharp focus when one seriously attempts to analyze the semantic content of expressions in natural language, since many types of linguistic expressions seem to require something beyond first-order logic to represent their meaning perspicuously. This project undertakes a program basic research in knowledge representation, focusing on the representation of concepts needed for the semantic analysis of natural language. The objectives of the project are to produce formalisms, suitable for manipulation by computer, for the representation of specific concepts that are important for natural-language semantics, and to give an independent account of the

(U) Knowledge Representations using the tools of formal logic. (Author)

DESCRIPTORS: (U) \*Artificial Intelligence, \*Natural Language, \*Semantics, Computer logic, Information retrieval, Models, Data bases, Air Force research

IDENTIFIERS: (U) Knowledge representation. LPN-SRI-4488

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AD-A148 004 8/19 DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVI19B  
CALIFORNIA UNIV DAVIS HUMAN PERFORMANCE LAB AD-A148 003 12/1 9/3  
(U) Combined Effects of Breathing Resistance and Hyperoxia in Aerobic Work Tolerance.

77 GP PERSONAL AUTHORS: Dressendorfer, R. H.; Wade, C. E.;  
Bernauer, E. M.; CONTRACT NO. AFOSR-78-3510  
PROJECT NO. 2312  
TASK NO. A1  
MONITOR: AFOSR TR-84-0784

77 GP PERSONAL AUTHORS: Safonov, M. G.;  
CONTRACT NO. AFOSR-80-0013  
PROJECT NO. 2304  
TASK NO. A1  
MONITOR: AFOSR TR-84-0835

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Applied Physiology: Respiratory, Environmental and Exercise Physiology, v42 n3 p444-448 1977.  
Reprint: Combined Effects of Breathing Resistance and Hyperoxia on Aerobic Work Tolerance.

DESCRIPTORS: (U) \*Respiration, \*Exercise(Physiology), \*Hyperoxia, Resistance(Biology), Males, Oxygen consumption, Rates, Work, Reprints  
IDENTIFIERS: (U) WUAOSR2312A1, PEB1102F

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE Proceedings, v129 ptD no 8 p251-258 Nov 82.  
Reprint: Stability Margins of Diagonally Perturbed Multivariable Feedback Systems.

DESCRIPTORS: (U) \*Control systems, \*Feedback, \*Transfer functions, Stability, Multivariate analysis, Perturbations, Matrices(Mathematics), Reprints  
IDENTIFIERS: (U) WUAOSR2304A1, PEB1102F

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI 198

AD-A145 944

20/6

MINNESOTA UNIV MINNEAPOLIS DEPT OF COMPUTER SCIENCE

(U) Analysis of Accretion and Deletion at Boundaries in Dynamic Scenes.

DESCRIPTIVE NOTE: Technical rept..

MAY 84

13P

PERSONAL AUTHORS: Nutch, K. M.; Thompson, W. B. ;

REPORT NO. TR-84-7

CONTRACT NO. F49620-83-C-0140

PROJECT NO. 2304

TASK NO. A7

MONITOR: AFOSR  
TR-84-0798

UNCLASSIFIED REPORT

ABSTRACT: (U) Locating object boundaries in images is an important but difficult problem. Intensity-based edge detection provides ambiguous or misleading boundary information in many situations, such as textured regions. Motion-based techniques can provide more reliable results in these cases. At object boundaries where occlusion occurs, surface regions will typically appear or disappear over time when motion is present. These regions of changing visibility may be used to indicate both object boundaries and the side of the boundary corresponding to the occluded surface. Thus, in dynamic scenes, regions of surface association or deletion can be found using matching technique similar to those used to determine optical flow in an image sequence. Regions in one frame that are not adequately matched by any region in previous frames correspond to accretion. Regions that have no matches in subsequent frames correspond to deletion. In either case, an occlusion boundary is present. Furthermore, by associating accretion or deletion regions with a surface on one side of a boundary, it is possible to determine which side of the boundary is being occluded. This association can be based purely on visual motion - the association or deletion region moves with the same image velocity as the remaining visible surface to which it is attached.

AD-A145 944

CONTINUED

DESCRIPTORS: (U) \*Optical Images, Boundaries, Flow,

Sides, Matching, Surfaces, Edges, Motion

IDENTIFIERS: (U) Edge detection, WUAFOSR2304A7, PE81102F

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AD-A145 940 11/8 10/1 DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVI19B  
ARIZONA STATE UNIV TEMPE DEPT OF MECHANICAL AND IDENTIFIERS: (U) MUAFOSR230842 PE81102F  
AEROSPACE ENGINEERING CONTINUED

(U) Material Problems for High-Temperature, High-Power Space Energy-Conversion Systems.

DESCRIPTIVE NOTE: Progress rept. no. 1 (Annual).

MAY 84 124P

PERSONAL AUTHORS: Rama Ingam, M. L.; Jacobson, D. L.; MORRIS, J. F.; Snir, S.

REPORT NO. CR-R-84092

CONTRACT NO. AFOSR-83-0087

PROJECT NO. 2308

TASK NO. A2

MONITOR: AFOSR

TR-84-0800

UNCLASSIFIED REPORT

ABSTRACT: (U) High-temperature, high-power space energy-conversion systems follow an evolutionary path through continually expanding materials frontiers. Exponential growth trends point to requirements for ultimate alloys comprising the most refractory metals and metalloid additives. Therefore understanding properties, transport tendencies and interaction characteristics of these ultralow coeponents is a crucial essentiality. Studies of such thermophysical phenomena and their detailed parametric dependencies and influences for refractory materials receive intensive and extensive support in the USSR and other iron-curtain countries. But all potential users also recognize the generic ductility, embrittlement enigmas of the highest-temperature alloys--and the related implications of recrystallization. This latter category is the research area of concentration for these studies.

DESCRIPTORS: (U) \*Space systems, \*Energy conversion, \*High power, \*Materials, Alloys, Embrittlement, Additives, Interactions, Recrystallization, Refractory metals, Ductility, Tungsten

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SEARCH CONTROL NO. EVI198

AD-A145 931

8/16

CALIFORNIA UNIV DAVIS

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF  
ELECTRICAL ENGINEERING

(U) Stretch-Induced Growth In Chicken Wing Muscles. A New  
Model of Stretch Hypertrophy.

80

11P

PERSONAL AUTHORS: Holly, R. G. ; Barnett, J. G. ; Ashmore, C.  
R. ; Taylor, R. G. ; Moles, P. A. ;

(U) The Linear-Quadratic Optimal Control Problem - The  
Operator Theoretic Viewpoint.

84

28P

PERSONAL AUTHORS: Jonckheere, E. A. ; Silverman, L. M. ;

CONTRACT NO. AFOSR-78-3510

CONTRACT NO. AFOSR-80-0013

PROJECT NO. 2312

PROJECT NO. 2304

TASK NO. A1

TASK NO. A1

MONITOR: AFOSR  
TR-84-0782

MONITOR: AFOSR  
TR-84-0836

**UNCLASSIFIED REPORT**

SUPPLEMENTARY NOTE: Pub. In American Jnl. of Physiology,  
v238 n7 PC82-C71 1980.

Reprint: Stretch-Induced Growth In Chicken Wing Muscles.  
A New Model of Stretch Hypertrophy.

DESCRIPTORS: (U) \*Muscles, \*Growth(Physiology), \*Muscle  
fibers, Stretch forming, Chickens, Enzymes,  
Electromyography, Reprints

IDENTIFIERS: (U) PEG1102F, WUAFOSR2312A1

**UNCLASSIFIED REPORT**

SUPPLEMENTARY NOTE: Pub. In Operator Theory: Advances and  
Applications, v12 p277-302 1984.

Reprint: The Linear-Quadratic Optimal Control Problem--  
The Operator Theoretic Viewpoint.

DESCRIPTORS: (U) \*Control theory, \*Control systems,  
\*Linear systems, Optimization, Hilbert space, Riccati  
equation, Operators(Mathematics). Reprints

IDENTIFIERS: (U) Wiener Hopf operators, Linear quadratic  
optimal control, PEG1102F, WUAFOSR2304A1

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AD-A145 908

20/6

## TEXAS UNIV AT AUSTIN COLL OF ENGINEERING

(U) Automatic Recognition and Turbulent Objects.

DESCRIPTIVE NOTE: Annual rept. 1 Dec 82-31 Dec 83.

DEC 83 18P

PERSONAL AUTHORS: Aggarwal, J. K. ;

CONTRACT NO. F49620-83-K-0013

PROJECT NO. 2305

TASK NO. B3

MONITOR: AFOSR

TR-84-0771

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) The report describes briefly the following three projects: (1) A Normalized Quadtree Representation and A Volume/Surface Octree Representation; (2) Analysis of a Model for Parallel Image Processing; and (3) Determination Motion Parameters Using Intensity and Range Information.

**DESCRIPTORS:** (U) \*Optical data, \*Image processing, \*Optical images, Motion, Algorithms, Pattern recognition, Parallel processing, Automatic, Parameters

**IDENTIFIERS:** (U) Quadtrees, PEE1102F, WUAFOSR2305B3SEARCH CONTROL NO. EVI19B  
AD-A145 904 12/1

## NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS

(U) Extrapolation and Moving Average Representation for Stationary Random Fields and Beurling's Theorem.

DEC 84 14P

PERSONAL AUTHORS: Soltani, A. R. ;

CONTRACT NO. F49620-82-C-0009

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR

TR-84-0801

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Annals of Probability, v12 n1 P120-132 1984.

Reprint: Extrapolation and Moving Average Representation for Stationary Random Fields and Beurling's Theorem.

**DESCRIPTORS:** (U) \*Random variables, \*Extrapolation, Stationary, Hilbert space, Functions(Mathematics), Reprints

**IDENTIFIERS:** (U) \*Moving average representation, Beurlings theorem, Polydiscs, PEE1102F, WUAFOSR2304A5

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EV1198

AD-A145 898

7/4

TRW SPACE AND TECHNOLOGY GROUP REDONDO BEACH CA

(U) Study of Singlet Oxygen-Pentavalent Phosphorus Reactions.

DESCRIPTIVE NOTE: Final rept. Apr 82-May 84.

MAY 84 37P

PERSONAL AUTHORS: Marabelli, L. J.; Kuper, J.; Lovejoy, C.; Bettis, J.;

CONTRACT NO. F49620-82-C-0046

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR TR-84-0499

UNCLASSIFIED REPORT

ABSTRACT: (U) Detailed studies of an atomic oxygen-singlet oxygen-dimethyl hydrogen phosphite (DMP) gas phase reaction system have been performed. Decay of singlet delta oxygen was modeled and a reaction mechanism which explains the experimental observations was derived. Semilog plots of O2 singlet delta emission intensities in the presence of O-atoms and DMP versus time obtained show an initial rise in the emission followed by a straight line decay.

DESCRIPTORS: (U) \*Phosphorus, \*Oxygen, \*Chemical reactions, Gases, Kinetics, Phosphites, Decay, Phosphonates, Esters

IDENTIFIERS: (U) Singlets, PE81102F, WUAFOSR2303B1

AD-A145 878

20/5

ROCHESTER UNIV NY DEPT OF CHEMISTRY

(U) Laser-Induced Neutralization and Negative-Ion Formation in Surface Scattering.

SP

PERSONAL AUTHORS: Lam, K. S.; Liu, K. C.; George, T. F.;

CONTRACT NO. AFOSR-82-0046

PROJECT NO. 2303

TASK NO. A2

MONITOR: AFOSR TR-84-0768

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in SPIE, v459 p18-21 1984.  
Reprint: Laser-Induced Neutralization and Negative-Ion Formation in Surface Scattering.

DESCRIPTORS: (U) \*Laser applications, \*Ionization, \*Scattering, Surfaces, Neutralization, Anions, Metals, Resonance, Electron transfer, Conduction bands

IDENTIFIERS: (U) PE81102F, WUAFOSR2303A2

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DTIC REPORT BIBLIOGRAPHY	SEARCH CONTROL NO.	EV19B
AD-A145 872      9/2      13/8 SRI INTERNATIONAL    MENLO PARK CA	AD-A145 864      20/2	FLORIDA UNIV GAINESVILLE DEPT OF ELECTRICAL ENGINEERING
(U) Test-Bed for Programmable Automation Research. Phase I. DESCRITIVE NOTE: Final rept.. 1 Sep 82-31 Mar 84.	(U) Studies of Grown-In Defects Versus Growth Parameters in III-V Compound Semiconductors.	DESCRIPTIVE NOTE: Annual technical rept. 11 Jun 83-10 Jun 84.
APR 84      94P	JUN 84      139P	PERSONAL AUTHORS: Smith, R. C. ; Bolles, R. C. ; Herson, J. H. ; Myers, J. K. ; Nitzan, D. ;
CONTRACT NO. F49620-82-K-0034	PERSONAL AUTHORS: Li, S. S. ;	CONTRACT NO. AFOSR-81-0187
PROJECT NO. 2305	PROJECT NO. 2306	PROJECT NO. 2306
TASK NO. K1	TASK NO. B1	MONITOR: AFOSR TR-84-0776

UNCL ASSIFIED REPORT

**ABSTRACT:** (U) The goals of this project were to: Explore and develop programmable automation techniques for robot manipulation, sensing, and industrial vision; and Extend our programmable assembly station as a test-bed for generating and demonstrating those techniques. Five research tasks were concerned with two general problems: determining the location of parts, and moving a manipulator safely, without collisions. A sixth task was the extension of SRI's programmable assembly station. The tasks were: Analysis of Locational Uncertainty; Acquisition and Analysis of Range Data; Characterization of Feature Detectors; Multi-arm Collision Avoidance; Coordination of Multiple Manipulators; and Extension of a Programmable Assembly Station.

**DESCRIPTORS:** (U) \*Computer applications, \*Automation, \*Computer programming, \*Test beds, Detectors, Data acquisition, Collision avoidance, Robots, Manipulators, Triangulation, Transformations, Air Force research

**DESCRIPTORS:** (U) \*Semiconductors, \*Defects(Materials), Group III compounds, Group V compounds, Radiation effects, Gallium arsenides, Crystal growth

**ABSTRACT:** (U) The objectives of this research are to conduct: (1) A detailed analysis of the grown-in defects and radiation induced defects in GaAs and other III-V materials grown by the LEC, VPE, LPE, and MOCVD techniques under different growth and annealing conditions, (2) Theoretical modeling of the native defects for identifying the physical origins of the deep-level traps in GaAs and other III-V materials, (3) Theoretical and experimental study of the potential well of electron traps from analyzing the electric field enhanced emission rates deduced from the nonexponential DLTS data, and (4) Study of one-MeV electron irradiation induced deep-level defects in GaAs, AlGaAs, and InP materials. The main research accomplishments are summarized.

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI19B

AD-A145 881 12/1

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF  
ELECTRICAL ENGINEERING(U) Return Difference Feedback Design for Robust  
Uncertainty Tolerance in Stochastic Multivariable  
Control Systems.

DESCRIPTIVE NOTE: Final rept. 1 Oct 82-29 Sep 84.

JUL 84 22P

PERSONAL AUTHORS: Safonov, M. G. ;

CONTRACT NO. AFOSR-80-0013

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR  
TR-84-0802

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) The objective of the research has been to develop engineering methodologies applicable, but not limited, to aerospace automatic control design problems in which there are performance specifications requiring precise control of system behavior in the presence of stochastic disturbances (e.g., wind gusts) and large-but-bounded uncertainties in the dynamical response of the system (e.g., parameter uncertainty, unmodeled nonlinearities, and so forth). During the past three years of research, a cohesive body of theory has been developed that enables engineers to relate the ability of feedback control systems to meet such specifications directly and quantitatively to the 'return difference' matrix, associated with the system's feedback loops. Now results enabling the infinity optimization of returned difference singular value Bode plots promise to be of great value in robust multivariable feedback controller synthesis. Continuing research is currently being aimed at further tightening the links between this theory and the most recent developments of modern stochastic linear optimal control synthesis theory, and extending the results to admit more practical problems so that this theory may be used more effectively by engineers to efficiently and systematically design the feedback gains that determine a feedback system's return difference

AD-A145 881 CONTINUED

matrix. Such results substantially reduce the dependence of control engineers on intuition, simulation, and luck and provide the know-how to successfully and efficiently solve the increasingly complex and demanding aerospace control problems of the coming decades. (Author)

**DESCRIPTORS:** (U) \*Multivariate analysis, \*Control systems, \*Stochastic processes, Finite difference theory, Aerospace systems, Dynamic response, Matrices(Mathematics), Methodology, Cohesion, Engineers, Simulation, Bodies, Behavior, Synthesis, Precision, Feedback, Theory, Control, Gusts, Loops, Value, Wind

**IDENTIFIERS:** (U) Multivariate controls, Stochastic controls, PE81102F, WUAFOSR2304A1

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AD-A145 852 12/1  
WASHINGTON UNIV SEATTLE  
(U) Resonant Modal Interactions and Adiabatic Invariance  
for a Nonlinear Wave Equation in a Variable Domain.  
84 6SP

PERSONAL AUTHORS: Kevorkian, J.; Li, H. K. ;  
CONTRACT NO. AFOSR-80-0178  
PROJECT NO. 2304  
TASK NO. A4  
MONITOR: AFOSR TR-84-0824

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVI19B  
AD-A145 851 12/1 9/3  
UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF  
ELECTRICAL ENGINEERING  
(U) Stability of Interconnected Systems Having Slope-  
Bounded Nonlinearities.

JUN 84 14P

PERSONAL AUTHORS: Safonov, M. G. ;  
CONTRACT NO. AFOSR-80-0013  
PROJECT NO. 2304  
TASK NO. A1  
MONITOR: AFOSR TR-84-0809

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Studies in Applied  
Mathematics, p1-64 1984.

Reprint: Resonant Modal Interactions and Adiabatic  
Invariance for a Nonlinear Wave Equation in a Variable  
Domain.

DESCRIPTORS: (U) \*Wave equations, \*Nonlinear algebraic  
equations, \*Invariance, \*Adiabatic conditions, \*Stability,  
Transformations(Mathematics), Perturbations, Interactions,  
Resonance, Computations, Reprints

IDENTIFIERS: (U) PEG1102F, MUAFOSR2304A4

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Proceedings of Conference on  
Analysis and Optimization of Systems, 19-22 Jun 84.

Reprint: Stability of Interconnected Systems Having Slope-  
Bounded Nonlinearities.

DESCRIPTORS: (U) \*Nonlinear systems, \*Stability,  
Matrices(Mathematics), Multiplication, Transfer functions,  
Reprints

IDENTIFIERS: (U) PEG1102F, MUAFOSR2304A1

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SEARCH CONTROL NO. EVI19B

AD-A145 828

12/1

RENSSELAER POLYTECHNIC INST TROY NY DEPT OF MATHEMATICAL SCIENCES

(U) Non-Linear Systems in Infinite Dimensional State Spaces.

DESCRIPTIVE NOTE: Interim technical progress rept. 15 Jun 83-14 Jun 84.

AUG 84 4P

PERSONAL AUTHORS: Siemrood, M. ;

CONTRACT NO. AFOSR-81-0172

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR TR-84-0818

DESCRIPTIVE NOTE: Final rept. 1 May 81-31 Aug 84.

JUL 84 SP

PERSONAL AUTHORS: Colton, D. L. ;

CONTRACT NO. AFOSR-81-0103

PROJECT NO. 2304

TASK NO. A4

MONITOR: AFOSR TR-84-0798

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) The research in this effort has been directed into two main research areas -- nonlinear distributed parameter control systems, and nonlinear continuum dynamics with an emphasis on phase transitions. In the first year, the investigator has formulated a theory of feedback stabilization of a one dimensional string using non-local 'pseudo-punctual' magnetic controls. In the second area, work has centered on materials exhibiting first order phase transitions. This should provide a unified theory of dynamic phase transitions and their numerical computation. Ten papers were prepared for presentation or publication during this period. (Author)

**DESCRIPTORS:** (U) \*Control theory, Feedback, Continuum mechanics, Dynamics, Nonlinear systems, Phase transformations

**IDENTIFIERS:** (U) Phase transitions, State spaces, PEG1102F, MUAFOSR2304A1

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## UNCLASSIFIED REPORT

**ABSTRACT:** (U) During this period, the single investigator investigated two topics. On the inverse scattering problem he wrote 1 book, 8 research papers and 7 survey papers. On the inverse Stefan problem he wrote 3 research papers and 1 survey paper. The papers on inverse scattering derive and numerically implement new, stable methods for solution, obtain a variety of uniqueness theorems and investigate the class of far field patterns associated with the scattering of planes waves by a bounded obstacle. (The set of far field patterns is in general not dense in the space of square integrable functions defined on the unit sphere when the wave number is an eigenvalue of the interior problem. This suggests new methods of solution currently being investigated.) The papers on the inverse Stefan problem derive and numerically implement new methods for solution in two space variables, prove in a new way the strong maximum principle for the heat equation and obtain expansion theorems for analytic solutions for the heat equation.

**DESCRIPTORS:** (U) \*Scattering, Acoustic waves, Electromagnetic wave propagation, Patterns, Far field IDENTIFIERS: (U) \*Inverse scattering problem, Inverse Stefan problem, PEG1102F, MUAFOSR2304A1

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## DTIC REPORT BIBLIOGRAPHY

AD-A145 814	12/1	9/8	SEARCH CONTROL NO. EVI19B
UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF ELECTRICAL ENGINEERING			AD-A145 813 7/4
(U) Propagation of Conic Model Uncertainty in Hierarchical Systems.			ROCKWELL INTERNATIONAL ANAHEIM CA SCIENCE CENTER
JUN 83	10P		(U) Electrochemistry of Rare-Earth Diphthalocyanines.
PERSONAL AUTHORS:	Safonov, M. G. ;		DESCRIPTIVE NOTE: Final rept. 1 May 83-30 Apr 84.
CONTRACT NO.	AFOSR-80-0013, NSF-ECS81-12327		JUL 84 25P
PROJECT NO.	2304		PERSONAL AUTHORS: Nicholson, M. M. ; Neismiller, T. P. ;
TASK NO.	A1		REPORT NO. SC5383-1FR
MONITOR:	AFOSR TR-84-0807		CONTRACT NO. F49620-83-C-0088
			PROJECT NO. 2303
			TASK NO. B2
			MONITOR: AFOSR TR-84-0769

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE Transactions on Circuits & Systems, vCAS-30 no p388-398 Jun 83.

Reprint: Propagation of Conic Model Uncertainty in Hierarchical Systems.

DESCRIPTORS: (U) \*Probability, Conical bodies, Mathematical models, Hierarchies, Stability, Circuit Interconnections, Reprints

IDENTIFIERS: (U) \*Large interconnected systems, PE81102F, MJAFOSR2304A1

ABSTRACT: (U) Lutetium diphthalocyanine films on tin oxide electrodes in several aqueous chloride electrolytes were investigated by cyclic voltammetry and *in situ* visible-range absorption spectroscopy at controlled potentials. Although several redox processes of the dye film were evident in the voltammograms, they were more clearly resolved in the spectroelectrochemical data, from which equilibrium potentials corresponding to fifty percent conversion between successive oxidation states were determined.

DESCRIPTORS: (U) \*Electrochemistry, \*Phthalocyanines, \*Rare earth compounds, Lutetium compounds, Electrodes, Electrolytes, Dyes, Films, Tin compounds, Oxides, Voltammetry, Oxidation reduction reactions

IDENTIFIERS: (U) \*Diphthalocyanines, PE81102F, WUAFOSR2303B2

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI19B

AD-A145 811 20/11

NORTH CAROLINA UNIV AT CHARLOTTE DEPT OF MATHEMATICS

(U) Optimum Replacement of a System Subject to Shocks.

DESCRIPTIVE NOTE: Technical rept.,

AUG 84 12P

PERSONAL AUTHORS: Abdell-Hamoud, M. ;

CONTRACT NO. AFOSR-80-0245

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR  
TR-84-0817

UNCLASSIFIED REPORT

ABSTRACT: (U) A system is subject to shocks which cause the system to deteriorate. In previous studies, distribution properties of such systems are discussed for different types of deterioration processes. At best these processes are right continuous Markov processes. Our interest in this paper is to tackle a related but different problem: we assume that the normal cost of running the system is ' $a$ ' per unit of time and that each shock to the system increases the running cost by ' $c$ ' per unit of time. The cost of completely replacing the system is  $c$  sub 0. The system is to be completely replaced at times  $T_1, T_2, \dots$ . Such replacement policies are known as periodic replacement policies. Since each shock weakens the system and makes it more expensive to run, it is desirable to determine a replacement time for the system. Boland and Proschan (4) consider periodic replacement of the system and give sufficient conditions for the existence of an optimal finite period, assuming that the shock process is a non-homogeneous Poisson process and the cost structure is time dependent, still requiring that the shock process is a nonhomogeneous Poisson process. We show, via a sample path argument, that the results of (3) and (4) hold for any counting process whose jump size of one unit magnitude.

DESCRIPTORS: (U) \*Shock Waves, \*Shock (Mechanics), Costs, Optimization, Replacement, Continuous processing, Deterioration, Markov processes, Time

AD-A145 811

UNCLASSIFIED

AD-A145 811 CONTINUED

dependence, Structural response

IDENTIFIERS: (U) PEG1102F, MUAFOSR2304AS

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AD-A145 811

## UNCLASSIFIED

## DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI19B

AD-A145 808 20/12 9/5

CALIFORNIA UNIV SAN DIEGO LA JOLLA DEPT OF ELECTRICAL  
ENGINEERING AND COMPUTER SCIENCES(U) Research on Materials and Components for Opto-  
Electronic Signal Processing.

DESCRIPTIVE NOTE: Annual rept. 1 Oct 82-30 Sep 83.

JAN 84 33P

PERSONAL AUTHORS: Chang, V. S. C.; Delavaux, J. M.;  
Forouhar, S.; Van Eck, T.; Walpita, L. H.

CONTRACT NO. AFOSR-80-0037

PROJECT NO. 2305

TASK NO. B1

MONITOR: AFOSR TR-84-0823

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) A number of papers representing the accumulated research results on the chirped grating lenses have been prepared and submitted for publication. They are summarized in this report. A new direction of research to investigate the use of III-V compound semiconductors has shown that very large electro-optical effects may be expected in this wavelength range. (Author)

**DESCRIPTORS:** (U) \*Semiconductors, \*Waveguides, \*Electrooptics, \*Signal processing, Lenses, Lithium niobates, Group III compounds, Group IV compounds, Gratings (Spectra), Optical waveguides, Fresnel lenses

**IDENTIFIERS:** (U) Chirped grating lenses, Waveguide lenses, Optoelectronic signal processing, Planar waveguides, Optical signals, AFOSR2305B1, PEG1102F

## DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI19B

AD-A145 805 12/1 20/6

MINNESOTA UNIV MINNEAPOLIS DEPT OF COMPUTER SCIENCE

(U) Dynamic Occlusion Analysis In Optical Flow Fields.

DESCRIPTIVE NOTE: Technical rept..

MAY 84 23P

PERSONAL AUTHORS: Thompson, W. B.; Hutch, K. M.; Berzins, V. A.

REPORT NO. TR-84-8

CONTRACT NO. F49620-83-C-0140, NSF-MCS81-05215

PROJECT NO. 2304

TASK NO. A7

MONITOR: AFOSR TR-84-0797

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) Optical flow can be used to locate dynamic occlusion boundaries in an image sequence. Derived an edge detection algorithm sensitive to changes in flow fields likely to be associated with occlusions. The algorithm is patterned after the Marr-Hildreth zero-crossing detectors currently used to locate boundaries in scalar fields. Zero-crossing detectors are extended to identify changes in direction and/or magnitude in a vector-valued flow field. As a result, the detector works for flow boundaries generated due to the relative motion of two overlapping surfaces, as well as the simpler case of motion parallax due to a sensor moving through an otherwise stationary environment. It is then shown the approach can be extended to identify which side of a dynamic occlusion boundary corresponds to the occluding surface. The fundamental principal involved is that at an occlusion boundary, the image of the surface boundary moves with the image of the occluding surface. Such information is important in interpreting dynamic scenes. Results are demonstrated from optical flow fields automatically computed from real image sequences. (Author)

**DESCRIPTORS:** (U) \*Algorithms, \*Flow fields, \*Optical processing, \*Computations, Edges, Detection, Motion, Optical properties, Dynamics, Images, Sequences.

AD-A145 805

AD-A145 808

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**DTIC REPORT BIBLIOGRAPHY**      **SEARCH CONTROL NO.** EVI198

**AD-A145 805**      **CONTINUED**

**Boundaries. Surfaces**

**IDENTIFIERS:** (U) Edge detection algorithm. \*Optical flow.  
Dynamic occlusion. WJA/AFOSR2304A7. PE81102F

**AD-A145 794**      **12/1**

**CALIFORNIA UNIV SANTA BARBARA INST FOR THE  
INTERDISCIPLINARY APPLICATIONS OF ALGEBRA AND  
COMBINATORICS**

**(U) Multiplicativity of L sub p Norms for Matrices. II.**

**84 11P**

**PERSONAL AUTHORS:** Goldberg, M. ;

**CONTRACT NO.** AFOSR-83-0150

**PROJECT NO.** 2304

**TASK NO.** A3

**MONITOR:** AFOSR  
TR-84-0792

**UNCLASSIFIED REPORT**

**SUPPLEMENTARY NOTE:** Pub. in Linear Algebra and Its  
Applications. P1-10 1984.

**Reprint:** Multiplicativity of 1 sub p Norms for Matrices.  
II.

**DESCRIPTORS:** (U) \*Matrices(Mathematics). \*Multiplication  
factor. Inequalities. Theorems. Reprints

**IDENTIFIERS:** (U) \*Multiplicativity. \*Norms.  
WJA/AFOSR2304A3. PE81102F

**AD-A145 805**

**AD-A145 794**

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DTIC REPORT BIBLIOGRAPHY				SEARCH CONTROL NO.	EVI19B
AD-A145 792	13/8	20/8		AD-A145 790	6/19
BATTELLE COLUMBUS LABS OH				CALIFORNIA UNIV DAVIS DEPT OF PHYSICAL EDUCATION	
(U) Three-Dimensional Photochemical Machining with Lasers.				(U) The Influence of Differential Physical Conditioning Regimens on Simulated Aerial Combat Maneuvering Tolerance.	
DESCRIPTIVE NOTE: Quarterly research and development status rept. no. 4, 1 May-31 Jul 83,					
NOV 83	8P			NOV 82	9P
PERSONAL AUTHORS:	Schmerzel, R. E. ;	E. M. ;	PERSONAL AUTHORS:	Epperson, W. L. ; Burton, R. R. ; Bernauer.	
CONTRACT NO.	F49620-82-C-0077		CONTRACT NO.	AFOSR-78-3510	
PROJECT NO.	2308		PROJECT NO.	2312	
TASK NO.	B2		TASK NO.	A1	
MONITOR:	AFOSR TR-84-0812		MONITOR:	AFOSR TR-84-0786	

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) Research on the development of new photoinitiator systems for spatially selective photochemical machining with lasers has continued smoothly and is progressing well. The porphyrin systems developed during the second quarter continue to look particularly promising. Further experiments on the 2-component photoinitiator systems comprised of 9,10-dibromoanthracene and naphthalene sulfonyl chloride have confirmed that photopolymerization can be selectively enhanced by 2-beam irradiation. This is the first report of a 2-photon, 2-component polymerization system, to our knowledge. (Author)

**DESCRIPTORS:** (U) \*Machining, \*Laser beams, Photochemical reactions, Polymerization, Porphyrins, Three dimensional, Chlorides, Naphthalenes, Sulfonyl halides

**IDENTIFIERS:** (U) Photoinitiators, AFOSR2312A1, PES1102F

## UNCLASSIFIED REPORT

**SUPPLEMENTARY NOTE:** Pub. in Aviation, Space, and Environmental Medicine, v53 n11 p1091-1097 Nov 82.

**Reprint:** The Influence of Differential Physical Conditioning Regimens on Simulated Aerial Combat Maneuvering Tolerance.

**DESCRIPTORS:** (U) \*Physical fitness, \*Acceleration tolerance, \*Tolerances (Physiology), Pilots, Stress(Physiology), Comparison, Correlation, Aeriel Warfare, Maneuverability, Flight, Reprints

**IDENTIFIERS:** (U) AFOSR2312A1, PES1102F

## UNCLASSIFIED

## DTIC REPORT BIBLIOGRAPHY

AD-A145 789 12/1

CALIFORNIA UNIV SANTA BARBARA INST FOR THE  
INTERDISCIPLINARY APPLICATIONS OF ALGEBRA AND  
COMBINATORICS

(U) Combinatorial Inequalities, Matrix Norms, and  
Generalized Numerical Radii. II.

83 12P

PERSONAL AUTHORS: Goldberg, M. ; Strauss, E. G. ;

CONTRACT NO. AFOSR-83-0150

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR  
TR-84-0788

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in General Inequalities 3, p195-  
204 1983. See also AD-A084 825.

Reprint: Combinatorial Inequalities, Matrix Norms, and  
Generalized Numerical Radii. II.

DESCRIPTORS: (U) \*Combinatorial analysis, \*Inequalities,  
Matrices(Mathematics), Eigenvalues, Multiplication factor,  
Reprints

IDENTIFIERS: (U) Norms, WUAFOSR2304A3, PEG1102F

## SEARCH CONTROL NO. EVI19B

AD-A145 779 6/18

## CALIFORNIA UNIV DAVIS DEPT OF PHYSICAL EDUCATION

(U) The Role of Physical and Physiological Capacities and  
Their Modification on the Tolerance to Various Stress  
Experienced by Air Force Personnel.

DESCRIPTIVE NOTE: Final rept..

JUN 84 18OP

PERSONAL AUTHORS: Bernauer, E. ; Mole, P. A. ; Adams, W. C. ;

CONTRACT NO. AFOSR-78-3510

PROJECT NO. 2312

TASK NO. A1

MONITOR: AFOSR  
TR-84-0787

## UNCLASSIFIED REPORT

31 Jun 84

ABSTRACT: (U) The final report addresses advances in  
anthropometric and physical conditioning that will  
improve physical fitness and orthostatic tolerance  
related to improvement in handling high sustained G (HGS)  
stress. Topics include: (1) Man, exercise and orthostasis,  
(2) Animal model response to HGS; and Man, thermal stress  
and physical performance. Five years of work are  
condensed in the report.

DESCRIPTORS: (U) \*Stress(Physiology), \*Tolerances(Physiology), Air Force personnel, High  
acceleration, Physical fitness, Capacity(Quantity), Orthostatism, Performance(Human), Thermal stresses

IDENTIFIERS: (U) PEG1102F, WUAFOSR2312A1

## UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI19B

AD-A145 772 12/1 9/3

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF  
ELECTRICAL ENGINEERING(U) Unification of Wiener-Hopf and State Space Approaches  
to Quadratic Optimal Control.

JUL 84 7P

PERSONAL AUTHORS: Safonov, M. G. ; Sideris, A. ;

CONTRACT NO. AFOSR-80-0013

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR  
TR-84-0838

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. In Proceedings of DIGITECH '84,  
Patras, Greece, 9-12 Jul 84.Reprint: Unification of Wiener-Hopf and State Space  
Approaches to Quadratic Optimal Control.DESCRIPTORS: (U) \*Control systems, \*Closed loop systems,  
Riccati equation, Optimization, Stability,  
Solutions (General). ReprintsIDENTIFIERS: (U) Wiener Hopf method, PEB1102F,  
WUAFOSR2304A1

AD-A145 766 9/1

GENERAL ELECTRIC CORPORATE RESEARCH AND DEVELOPMENT  
SCHENECTADY NY(U) Novel Techniques for the Fabricating and  
Characterization of GaAs MIS (Metal Insulator  
Semiconductor) Structures.

DESCRIPTIVE NOTE: Final rept. 1 Jan 83-29 Feb 84.

JUN 84 26P

PERSONAL AUTHORS: Ehler, R. S. ; Morris, W. G. ; Balliga, B. J. ;

REPORT NO. SRD-84-1001

CONTRACT NO. F49620-83-C-0031

PROJECT NO. 2308

TASK NO. B1

MONITOR: AFOSR  
TR-84-0780

## UNCLASSIFIED REPORT

ABSTRACT: (U) Organometallic chemical vapor deposition  
(OMCVD) of Al2O3 on GaAs has been investigated as a means  
of fabricating metal-insulator-semiconductor field effect  
transistors (MISFET). Deposition at temperatures less  
than 400C forms high-quality films of Al2O3. Diffusion  
can alter the composition during high-temperature anneals.  
In-situ etching of the GaAs just prior to depositing the  
Al2O3 markedly reduced surface generation velocities, but  
inversion at the interface was not conclusively  
demonstrated. (Author)DESCRIPTORS: (U) \*Field effect transistors, \*Field effect  
transistors, \*Metal oxide semiconductors, Electrical  
insulation, Metal contacts, Organometallic compounds,  
Vapor deposition, Gallium arsenides, Aluminum oxides,  
FabricationIDENTIFIERS: (U) \*MISFET(Metal Insulator Semiconductor  
Field Effect Transistors), PEB1102F

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## UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY      SEARCH CONTROL NO. EVI19B  
 AD-A145 759      12/1      AD-A145 758      12/1

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF  
 ELECTRICAL ENGINEERING

(U) Multivariable L-Infinity Sensitivity Optimization and  
 Hankel Approximation.

JUN 83      3P

PERSONAL AUTHORS: Safonov, M. G.; Verma, M. S. ;  
 CONTRACT NO. AFOSR-80-0013  
 PROJECT NO. 2304  
 TASK NO. A1  
 MONITOR: AFOSR TR-84-0845

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Proceedings of the American Control Conference, San Francisco, CA, 22-24 Jun 83.

ABSTRACT: (U) The problem of designing a feedback compensator to minimize a weighted L-infinity norm of the sensitivity function of a MIMO linear time invariant system is considered. The problem is solved by establishing its equivalence to the different but related problem of multivariate zeroth order optimal Hankel approximation solved recently by Kung and Lin. (Author)

DESCRIPTORS: (U) \*Control theory, Compensators, Feedback, Multivariate analysis, Functions, Sensitivity, Optimization

IDENTIFIERS: (U) Feedback compensators, Hankel approximation, WUAFOSR2304A1, PE81102F

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE Transactions on Automatic Control, VAC-29 n7 p629-631 Jul 84.  
 Reprint: An Output Error Method for Reduced Order Controller Design.

DESCRIPTORS: (U) \*Computations, \*Control systems, Least squares method, Linear systems, Closed loop systems, Transfer functions, Reprints

IDENTIFIERS: (U) PE81102F, WUAFOSR2304A6

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AD-A145 758

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## UNCLASSIFIED

AD-A145 795      9/2      12/1      DTIC REPORT BIBLIOGRAPHY      SEARCH CONTROL NO. EVI19B  
 PITTSBURGH UNIV PA CENTER FOR MULTIVARIATE ANALYSIS      AD-A145 748      17/2      12/1  
 COMPUTER EQUIPMENT FOR RESEARCH IN STATISTICS.

(U) Computer Equipment for Research in Statistics.  
 DESCRIPTIVE NOTE: Final scientific rept. 15 Jun 83-14 Jun 84.

AUG 84	SP	AUG 84	SP
PERSONAL AUTHORS:	Krishnamoorthy, P. R.	PERSONAL AUTHORS:	Liu, B.
CONTRACT NO.	AFOSR-83-0226	CONTRACT NO.	AFOSR-81-0186
PROJECT NO.	2304	PROJECT NO.	2304
TASK NO.	AS	TASK NO.	AB
MONITOR:	AFOSR TR-84-0822	MONITOR:	AFOSR TR-84-0785

## UNCLASSIFIED REPORT

ABSTRACT: (U) This grant purchased computer equipment to support basic research in multivariate analysis at the University of Pittsburgh. Some of the research areas to be supported by this equipment include the development of new methodology in multivariate analysis, techniques of data analysis in flight control problems, pattern recognition, and reliability and quality assurance. (Author)

DESCRIPTORS: (U) \*Computers, \*Statistical analysis, Multivariate analysis, Computer applications, Pattern recognition, Flight control systems, Reliability, Quality assurance, Air Force research

IDENTIFIERS: (U) PE81102F, MUAFOSR2304A5

ABSTRACT: (U) This report summarizes research in the areas of autoregressive model for spectrum estimation, steady state output error of the least mean square, and extrapolation of band limited signal in discrete-time. Papers produced during this period are listed.

DESCRIPTORS: (U) \*Signal processing, Least squares method, Estimates, Spectra, Extrapolation, Algorithms, Mathematical models

IDENTIFIERS: (U) PE81102F, MUAFOSR2304A6

UNCLASSIFIED

OTIC REPORT BIBLIOGRAPHY

AD-A145 738 17/2 12/1 SEARCH CONTROL NO. EVI198  
AD-A145 737 12/1

RANDOM APPLICATIONS INC MONTROSE CO

(U) On M-ary DPSK (Differential Phase-Shift Keying)  
Transmission Over Terrestrial and Satellite Channels.

JUL 84 11P

PERSONAL AUTHORS: Pawlis, R. F. :

CONTRACT NO. F49620-83-C-0085

PROJECT NO. 2304

TASK NO. A8

MONITOR: AFOSR

TR-84-0794 UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. In IEEE Transactions on  
Communications, VCDN-32 n7 p732-761 Jul 84.

Reprint: On M-ary DPSK (Differential Phase-Shift Keying)  
Transmission Over Terrestrial and Satellite Channels.

DESCRIPTORS: (U) \*Phase shift keyers, \*Computations,  
\*Communication and radio systems, Uplinks, Downlinks,  
Repeaters, Channels, Satellite communications, Reprints

IDENTIFIERS: (U) DPSK(Differential Phase Shift Keying),  
Terrestrial channels, PEG1102F, WUAFOSR2304A8

OTIC REPORT BIBLIOGRAPHY

AD-A145 737 12/1  
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF ELECTRICAL  
ENGINEERING

(U) United States Air Force on Research on Algebraic  
Manipulation.

DESCRIPTIVE NOTE: Final rept. 1 Jul 83-30 Jun 84.

AUG 84 13P

PERSONAL AUTHORS: Moses, J. :

CONTRACT NO. AFOSR-80-0250

PROJECT NO. 2304

TASK NO. A4

MONITOR: AFOSR  
TR-84-0785 UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) During this period the single investigator  
refined his technique for symbolic integration,  
implemented it in a computer program in MACSYMA, and  
produced and presented a paper describing his achievement  
entitled, An experiment toward a general quadrature for  
second order linear ordinary differential equations by  
symbolic computation. A measure of his success is that he  
was able to integrate successfully 90% of the 542  
equations in Kamke's famous table. (Since 50 of these  
equations involved arbitrary functions, etc., for which  
the programs was not designed, the success rate is more  
appropriately 86%.)

DESCRIPTORS: (U) \*Algebra, Integration, Symbols, Air  
Force research, Computer programs, Numerical quadrature,  
Linear differential equations, Computations

IDENTIFIERS: (U) Symbolic Integration, PEG1102F,  
WUAFOSR2304A8

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DTIC REPORT BIBLIOGRAPHY		SEARCH CONTROL NO.	EVI19B
AD-A145 729	12/1	20/3	AD-A145 727 5/10
UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF ELECTRICAL ENGINEERING		NOVA TECHNICAL INC TARZANA CA*	
(U) Input-Output Stability Analysis with Magnetic Hysteresis Non-Linearity - A Class of Multipliers, JUN 84 8P		(U) An Investigation of the Use of Steady-State Evoked Potentials for Human Performance and Workload Assessment and Control.	
		DESCRIPTIVE NOTE: Annual rept. 15 Jun 83-14 Jun 84.	
PERSONAL AUTHORS:	Safonov, M. G. ; Karimou, K. ;	JUN 84	20P
CONTRACT NO.	AFOSR-80-0013. NSF-INT83-02754	PERSONAL AUTHORS:	Noise, S. L. , Jr. ;
PROJECT NO.	2304	CONTRACT NO.	F49620-83-C-0102
TASK NO.	A1	PROJECT NO.	2313
MONITOR:	AFOSR TR-84-0803	TASK NO.	A4
		MONITOR:	AFOSR TR-84-0770

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) A class of positive real multipliers is obtained to establish frequency domain conditions for stability of feedback systems containing ferromagnetic hysteresis non-linearity. (Author)

**DESCRIPTORS:** (U) \*Mathematical models, \*Hysteresis, Input output models, Ferromagnetism, Nonlinear systems, Stability, Magnetic properties, Equations

**IDENTIFIERS:** (U) \*Multipliers, PEG1102F, MUAFOSR2304A1

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) This report describes the status of this AFOSR sponsored research program during the reporting period. This research program is designed to examine high frequency (40-80 Hz) Steady-State Evoked Potentials as a tool for providing information about human sensory and performance capability. In particular, a measure of relative transmission time through the visual system is to be evaluated. This report details the configuration of the test and data collection facility and reports the results of control and pilot studies. Some of this data suggests that there may be a frequency 'masking' effect in the visual system when multiple visual frequencies are simultaneously presented. If this is verified, it may represent a previously unobserved basic property of the visual system response to flashing stimuli.

**DESCRIPTORS:** (U) \*Work load, \*Performance(Human), Vision, High frequency, Stimuli, Masking, Response(Biology), Work measurement, Electrophysiology

**IDENTIFIERS:** (U) Evoked potential, MUAFOSR2313A4, PEG1102F

## UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY			SEARCH CONTROL NO.	EV119B
AD-A145 725	12/1	9/2	AD-A145 723	11/6
MARYLAND UNIV COLLEGE PARK CENTER FOR AUTOMATION RESEARCH			PRATT AND WHITNEY AIRCRAFT GROUP EAST HARTFORD CT	
(U) The Prism Machine: An Alternative to the Pyramid.				
DESCRIPTIVE NOTE: Technical rept..			INTERIM technical rept..	
JUL 84	18P		NOV 77	17P
PERSONAL AUTHORS: Rosenfeld, A. ;			PERSONAL AUTHORS: Dahl, D. N. ; Giamal, A. F. ;	
REPORT NO. CAR-TR-70, CS-TR-1416			REPORT NO. PWA-FR-9371	
CONTRACT NO. F49620-83-C-0082			CONTRACT NO. F44620-78-C-0028	
PROJECT NO. 2304			PROJECT NO. 2308	
TASK NO. A7			TASK NO. A1	
MONITOR: AFOSR TR-84-0838			MONITOR: AFOSR TR-84-0805	
UNCLASSIFIED REPORT				
<p><b>ABSTRACT:</b> (U) The prism machine is a stack of <math>n</math> cellular arrays, each of size <math>(2^k \times 2^l \times \dots \times 2^m)</math> to the <math>n</math> power). Cell <math>(i,j)</math> on level <math>k</math> is connected to cells <math>(i,j+1), (i+1,j), (i+1,j+2)</math> to the <math>K</math> power) on level <math>k+1</math>, <math>1 \leq i &lt; k</math>, or <math>i = k</math>, where the sums are modulo 2 to the <math>n</math> power. Such a machine can perform various operations (e.g., Gaussian convolutions or least-squares polynomial fits) on image neighborhoods of power-of-2 sizes in every position in <math>O(n)</math> time, unlike a pyramid machine which can do this only in sampled positions. It can also compute the discrete Fourier transform in <math>O(n)</math> time.</p>				
<p><b>DESCRIPTORS:</b> (U) *Computer architecture, *Parallel processing, *Image processing, Pyramids, Arrays, Least squares method, Fourier transformation, Histograms</p>				
<p><b>IDENTIFIERS:</b> (U) *Prism machines, Cellular arrays, PE81102F, WUAFOSR2304A7</p>				
<p><b>ABSTRACT:</b> (U) A study was conducted to determine the effects of crystallographic orientation and rhenium content on the creep behavior of a single crystal nickel-base superalloy. Creep tests conducted at 982 C and 220 MPa (32 ksi) on Alloy 444 single crystals show that there is an increase in creep strength as the specimen axis is varied from (001) to 28 C from (001). This orientation effect is favorable for use of nickel-base superalloy single crystal as turbine blade materials. Substitution of rhenium for tungsten in Alloy 444 increases creep strength. The mechanism for this effect is the subject of a continuing investigation.</p>				
<p><b>DESCRIPTORS:</b> (U) Superalloys, Fracture(Mechanics), Deformation, Anisotropy, Creep strength, Crystals, Orientation(Direction), Nickel alloys, Single crystals, Tungsten, Rhenium, Turbine blades</p>				
<p><b>IDENTIFIERS:</b> (U) PE81102F, WUAFOSR2308A1</p>				

## UNCLASSIFIED

## DTIC REPORT BIBLIOGRAPHY

AD-A145 722 12/1 9/3 SEARCH CONTROL NO. EVI19B  
AD-A145 712 8/16 5/10

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF  
ELECTRICAL ENGINEERING

(U) Multivariable Stability-Margin Optimisation with  
Decoupling and Output Regulation.

NOV 82 8P

PERSONAL AUTHORS: Safonov, M. G. ; Chen, B. S. ;

CONTRACT NO. AFOSR-80-0013

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR  
TR-84-0804

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE Proceedings, v129 Pt. D  
no P278-282 Nov 82.

Reprint: Multivariable Stability-Margin Optimisation with  
Decoupling and Output Regulation.

DESCRIPTORS: (U) \*Multivariate analysis, \*Control  
systems, \*Control theory, Decoupling, Sensitivity, Reprints  
optimization, Output, Stability.

IDENTIFIERS: (U) PEB1102F, MUAFOSR2304A1

## UNCLASSIFIED REPORT

ABSTRACT: (U) This contract funded a Satellite Symposium on the Mathematical Modeling of Circadian Systems which was held on June 21, 1981 in conjunction with the Annual Meeting of the Association for the Psychophysiological Study of Sleep (APSS) from June 17-21, 1981, at Dunfey's Hyannis Hotel on Cape Cod, Massachusetts. The Satellite Symposium brought together the leading investigators concerned with modeling the circadian system to ensure that the various proposed models were critically reviewed and their strengths and weaknesses in predicting periodic biological phenomena were fully understood. The papers of each participant and an edited transcription of the discussion were published as a book entitled 'Mathematical Models of the Circadian Sleep-Wake Cycle' by Raven Press in 1984. The published volume serves as an important source of all those who are concerned about the temporal organization of human and animal behavior and physiology. (Author)

DESCRIPTORS: (U) \*Circadian rhythms, \*Sleep,  
\*Mathematical models, Models, Simulation, Biomedicine,  
Sleep deprivation, Humans, Performance(Human), Behavior,  
Jet lag, Pacemakers, Oscillators, Biological rhythms

IDENTIFIERS: (U) \*Sleep-wake cycle, Human sleep.  
PEB1102F, MUAFOSR2312A1

AD-A145 722

AD-A145 712

AD-A145 722

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVI19B

AD-A145 709 12/1

NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS

(U) Estimation in Nonlinear Time Series Model II: Some  
Nonstationary Series.

DESCRIPTIVE NOTE: Technical rept..

JUL 84 45P

PERSONAL AUTHORS: Tjostheim, D. ;

REPORT NO. TR-71

CONTRACT NO. F49620-82-C-0009

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR

TR-84-0827

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also rept. dtd Jul 80. AD-A145  
614.

ABSTRACT: (U) In an earlier paper a general framework was introduced for analyzing estimates in stationary nonlinear time series models. In this present paper the framework is enlarged to include certain nonstationary and nonlinear series. General conditions for strong consistency and asymptotic normality are derived both for conditional least squares and maximum likelihood type estimates. Examples are taken from threshold autoregressive, random coefficient autoregressive and doubly stochastic (dynamic state space) models. The emphasis in the examples is on conditional least squares estimates. (Author)

DESCRIPTORS: (U) \*Time series analysis, Least squares method, Asymptotic normality, Stochastic processes, Estimates, Theorems

IDENTIFIERS: (U) Autoregressive models, PEB1102F,  
MUAFOSR2304AS

AD-A145 705 20/11

UNITED TECHNOLOGIES RESEARCH CENTER EAST HARTFORD CT

(U) Plastic Strain Localization in Superalloy Single  
Crystals.

DESCRIPTIVE NOTE: Annual rept. 1 May 83-30 Apr 84.

MAY 84 36P

PERSONAL AUTHORS: Anton, D. L. ; Giannelis, A. F. ;

REPORT NO. UTRC/R84-916534-1

CONTRACT NO. F49620-83-C-0104

PROJECT NO. 2308

TASK NO. A1

MONITOR: AFOSR  
TR-84-0775

UNCLASSIFIED REPORT

ABSTRACT: (U) Single crystals of a model Ni-base superalloy were heat treated so as to obtain two different gamma prime distributions; solutioned and quenched and fully aged. Surface replicas of slip occurring after small amounts of plastic deformation were analyzed using TEM techniques as a function of crystal orientation. Slip bands were clearly composed of a large number of fine slip lines. These slip lines were spaced approximately 50 nm apart. A model which describes the mechanism by which these slip lines spread and form slip bands is proposed and substantiated with TEM thin foil micrographs of the deformed alloy. (Author)

DESCRIPTORS: (U) \*Plastic deformation, \*Strain(Mechanics)  
Nickel alloys, Orientation(Direction)

IDENTIFIERS: (U) Slip, Localization, PEB1102F,  
MUAFOSR2306A1

AD-A145 705

AD-A145 705

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DTIC REPORT BIBLIOGRAPHY			SEARCH CONTROL NO.	EVI198
AD-A145 702	8/18	5/10	AD-A145 700	12/1 20/6
TEXAS UNIV AT ARLINGTON			GEORGIA INST OF TECH ATLANTA SCHOOL OF ELECTRICAL ENGINEERING	
(U) Eyelid Motion Sequences Predictive of Decision Errors.			(U) Design of Edge Detectors for Reduced Images.	
DESCRIPTIVE NOTE: Final rept. Apr 83-Aug 84.			DESCRIPTIVE NOTE: Final technical rept. 1 Jun 83-31 May 84.	
PERSONAL AUTHORS:	Labb, M. L. :		JUL 84	43P
CONTRACT NO.	AFOSR-83-0129		PERSONAL AUTHORS:	Healy, D. J. :
PROJECT NO.	2313		CONTRACT NO.	AFOSR-83-0152
TASK NO.	D9		PROJECT NO.	2304
MONITOR:	AFOSR		TASK NO.	D9
	TR-84-0773		MONITOR:	AFOSR
				TR-84-0815

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) Nine normal human subjects were measured by electrooculographic and video tape of the eyes during performance on a human/animal analog of the serial probe recognition task. The task was modified to distinguish attention (the missed signal) errors from decision (failure to make same versus different discrimination) errors. Two types of eyelid closing and reopening sequences were observed to be progressive with time-on-task with the earlier, Type I sequence being indicative of correct responses. The velocity of the eyelid in motion over the pupil also significantly discriminated decision correct from decision error trials. The results were interpreted to support the hypothesis that information processing function progressively deteriorates over time-on-task and is indicated by variations in oculomotor patterns.

**DESCRIPTORS:** (U) \*Eye movements, \*visual perception, Decision making, Errors, Information processing, Electrooculography, Perception(Human), Recognition, Discrimination, Accuracy

**IDENTIFIERS:** (U) Eyelid motion, PEB1102F

**ABSTRACT:** (U) The development of algorithms to extract informational features from imagery is an area of active research. These algorithms enable computerized devices to automatically locate and identify objects in the field of view of a sensor. An important Air Force application is automatic target identification and weapon guidance. Edges in an image contain much of the information necessary to classify objects. This investigation has centered on finding methods for reducing an image so as to maximize the retention of edge information which was subsequently extracted. The霍尔特林 transform which reduces image data so as to minimize intensity mean-square error (IMSE) in the reconstructed image was also found to have significantly better edge retaining ability than simple averaging. The reconstructed edges were quantitatively compared to those in the original images using MSE and receiver operating characteristic based measures. One such measure used was the gradient mean-square error (GMSE). Both the reconstructed IMSE and GMSE using the霍尔特林 transform tend to decrease as the encoding block size increases. An equation relating GMSE to IMSE was developed. For image gradient blocks that are independently reconstructed, the linear transformation matrix A that minimizes the reconstructed GMSE and in that sense maximizes edge retention was derived. (Author)

AD-A145 702

AD-A145 700

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## DTIC REPORT BIBLIOGRAPHY

AD-A145 700      CONTINUED

**DESCRIPTORS:** (U) \*Algorithms, \*Image processing, \*Edges, \*Detectors, Coding, Extraction, Automatic, Target recognition, Target acquisition, Data reduction, Retention(General), Transformations(Mathematics), Air Force planning

**IDENTIFIERS:** (U) \*Image reduction, Mean square error, Hotelling transform, PEG1102F, WUAFOSR2304DS

IAC NO. GC-840931

IAC DOCUMENT TYPE: GACIAC - MICROFICHE --

**IAC SUBJECT TERMS:** G-(U)Edge detection, Feature extraction, Algorithms, Image processing, Data reduction, Edge extraction, Images, Pixels, Transformations, Mathematics, ;

AD-A145 695

SEARCH CONTROL NO. EVI19B

20/6

9/1

CALIFORNIA UNIV IRVINE DEPT OF ELECTRICAL ENGINEERING  
 (U) Guided-Wave Optic Devices for Integrated Optic Information Processing.

DESCRIPTIVE NOTE: Annual scientific rept. 30 Jan 83-30 Jan 84.

AUG 84

48P

PERSONAL AUTHORS: Tsai, C. S. ;

CONTRACT NO. AFOSR-80-0288

PROJECT NO. 2305

TASK NO. B1

MONITOR: AFOSR  
TR-84-0772

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) Integrated or Guided-Wave Optics is an emerging technology that has the ultimate potential of integrating miniature optical components such as laser light sources, modulators, switches, deflectors, lenses, prisms, and detectors in a common substrate. The resultant integrated optic circuits and subsystems are expected to have a number of advantages over the conventional bulk optical systems in certain areas of applications. Some of the advantages include smaller size and lighter weight, wider bandwidth, lesser electrical drive power requirement, greater signal accessibility, and integratability. The integrated optic circuits are also expected to possess advantages in stability, reliability, ruggedness, and ultimate cost. It has been recognized for some time that the most immediate applications of integrated optics lie in the areas of wideband multichannel communications and signal processing (for both civilian applications such as fiber optic systems and military hardware such as sensors and radars). The general objectives of this research program are to study the basic physical mechanisms/phenomenon of new and novel guided-wave devices with application to wideband multichannel optical information processing. The major tasks that have been carried out during this program year include theoretical and experimental research on the following two major topics: (1) Wideband

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## DTIC REPORT BIBLIOGRAPHY

AD-A145 695      CONTINUED

Guided-Wave Acoustooptic Interactions and Devices in GaAs-  
ZnO composite waveguides, and (2) Planar Guided-Wave  
Magneto-Optic Bragg Diffraction and Devices in YIG-GGG  
Waveguides.

**DESCRIPTORS:** (U) \*Optical equipment components, \*Optical circuits, \*Waveguides, \*Information processing, Integrated circuits, Integration, Miniaturization, Broadband, Multichannel communications, Signal processing, Acoustooptics, Substrates, Lightguide, Magneto statics, Surface waves, Gallium arsenides, Zinc oxides, Magneto optics, Diffraction

**IDENTIFIERS:** (U) \*Guided wave optics, MUAFOSR2305B1,  
PE61102F

SEARCH CONTROL NO.	EVI19B
AD-A145 674	20/6
BATTELLE COLUMBUS LABS OH	20/1
(U) Optical Waveguide Spatial Filters.	9/5
DESCRIPTIVE NOTE: Final rept..	12/1
MAY 84 62P	
PERSONAL AUTHORS: Verber, C. M.; Kenan, R. P.; Busch, J. R.; Parmenter, M.	
CONTRACT NO. F49620-79-C-0044	
PROJECT NO. 2305	
TASK NO. B1	
MONITOR: AFOSR	
TR-84-0811	

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) This report deals with the continued development of analog computational devices using planar Ti-indiffused LiNbO<sub>3</sub> waveguide technology. A previously developed integrated optical spatial light modulator is used to implement a electrical-digital-optical-analog converter. Designs for matrix-vector and matrix-matrix multipliers are developed and detailed characterization of an electrooptic herringbone electrode structure which is used in these devices is presented. (Author)

**DESCRIPTORS:** (U) \*Spatial filtering, \*Optical waveguides, \*Digital to analog converters, \*Surface acoustic wave devices, \*Optical correlators, \*Light modulators, Programmed instruction, Parallel processing, Signal processing, Analog systems, Fourier transformation, Integrated circuits, Laser beams, Optical circuits, Computations, Electrodes, Digital systems, Transducers, Clocks, Structural properties, Electrophysics

**IDENTIFIERS:** (U) Analog multiplication, Numerical optical computing, Diffraction orders, Matrix multiplication, Vector multiplication, Beam stops, Integrated optics, Herringbones, Grating arrays, Analog registers, Electrooptic gratings, Systolic processors, Multipliers, PE61102F, MUAFOSR2305B1

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AD-A145 674

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## DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI19B

AD-A145 673 12/1

NORTH CAROLINA UNIV AT CHAPEL HILL INST OF STATISTICS

(U) An Asymptotic Theory for Logistic Regression When Some Predictors Are Measured with Error.

DESCRIPTIVE NOTE: Technical rept.

DEC 83 32P

PERSONAL AUTHORS: Stefanek, L. A. :Carroll, R. J. :

REPORT NO. MINED SER-1B42

CONTRACT NO. F49620-82-C-0008

MONITOR: AFOSR

TR-84-0840

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Cornell Univ., Ithaca, NY.

ABSTRACT: (U) This document considers a local measurement error theory for logistic regression which is applied to four different methods: ordinary logistic regression without accounting for measurement error, a functional maximum likelihood estimate, an estimate based on linearizing the logistic function and an estimator conditioned on certain appropriate sufficient statistics. This asymptotic theory includes a bias-variance trade off, which is used to construct new estimators with better asymptotic and small sample properties. (Author)

DESCRIPTORS: (U) \*Regression analysis, Estimates, Errors, Probability, Monte Carlo method, Theorems

IDENTIFIERS: (U) Likelihood estimation, Asymptotic theory, Logistic regression

## DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI19B

SRI INTERNATIONAL MENLO PARK CA

(U) Silicon Nitride Joining.

DESCRIPTIVE NOTE: Annual rept. 1 Feb 83-31 Mar 84.

MAY 84 77P

PERSONAL AUTHORS: Johnson, S. M. :Roucliffe, D. J. :

CONTRACT NO. F49620-81-K-0001

PROJECT NO. 2308

TASK NO. A2

MONITOR: AFOSR  
TR-84-0778

## UNCLASSIFIED REPORT

ABSTRACT: (U) The results obtained in the third year of a continuing investigation into a method of joining silicon nitride with an oxide glass are described. Mechanical behavior of joints at room temperature and the criteria for strong joints are detailed. Two approaches were taken to strengthen the joints: heat treatments to crystallize the glass in the joint and surface preparation. The high temperature behavior of various Si<sub>3</sub>N<sub>4</sub>/glass systems was investigated by means of high temperature mechanical tests, mass spectrometry, theoretical calculations, and mass transport studies.

DESCRIPTORS: (U) \*Silicon nitrides, \*Joining, Glass, Heat treatment, Mechanical properties, Mass spectrometry, Surfaces, Preparation, High temperature, Oxides, Joints

IDENTIFIERS: (U) PE81102F, WUAFOSR2308A2, LPN-SRI-PYU-2527

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI19B

AD-A145 681      9/2

STATE UNIV OF NEW YORK AT STONY BROOK DEPT OF COMPUTER  
SCIENCE

(U) Summary of Research, Grant AFOSR-81-0197, 15 June 1983  
- 14 June 1984.

DESCRIPTIVE NOTE: Interim rept.,

AUG 84      SP

PERSONAL AUTHORS: Bernstein, A. J. ;

CONTRACT NO. AFOSR-81-0197

PROJECT NO. 2304

TASK NO. A2

MONITOR: AFOSR  
TR-84-0883

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) The research performed under this grant  
was concerned with distributed languages and algorithms.

DESCRIPTORS: (U) \*Algorithms, \*Programming languages,  
Distributed data processing, Data bases, Networks,  
Computer files

IDENTIFIERS: (U) Distributed algorithms, PEG1102F,  
MUAFOSR2304A2

FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS

(U) Tests for Properties of the Percentile Residual Life  
Function.

83      34P

PERSONAL AUTHORS: Joe, H. ; Proschan, F. ;

CONTRACT NO. F49620-82-K-0007

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR  
TR-84-0883

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. In Commun. Statist. - Theor.  
Meth., v12 n10 p1087-1119 1983.

Reprint: Tests for Properties of the Percentile Residual  
Life Function.

DESCRIPTORS: (U) \*Distribution functions, \*Statistical  
tests, Statistical inference, Reprints

IDENTIFIERS: (U) \*Life functions, \*Life distribution,  
MUAFOSR2304A5, PEG1102F

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DTIC REPORT BIBLIOGRAPHY		SEARCH CONTROL NO. EVI19B
AD-A145 840	9/2	AD-A145 639
OAKLAND UNIV	ROCHESTER MI SCHOOL OF ENGINEERING	12/1
(U) Fault Tolerant Computing Research.		RENNSELAER POLYTECHNIC INST TROY NY DEPT OF MATHEMATICAL SCIENCES
DESCRIPTIVE NOTE: Final rept. 1 Jul 80-30 Jun 83.		(U) Numerical Methods for Singularly Perturbed Differential Equations with Applications.
SEP 83	12P	DESCRIPTIVE NOTE: Interim rept. 1 Jun 83-31 May 84.
PERSONAL AUTHORS:	Pradhan, D. K. ;	AUG 84 21P
CONTRACT NO.	AFOSR-80-0217	PERSONAL AUTHORS: Flaherty, J. E. ;
PROJECT NO.	2304	CONTRACT NO. AFOSR-80-0192
TASK NO.	A6	PROJECT NO. 2304
MONITOR:	AFOSR TR-84-0841	TASK NO. A3
		MONITOR: AFOSR TR-84-0844

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) During this reporting period, three main topics were investigated: (1) Design of fault tolerant computers using read-only memories as basic building blocks; (2) Design of programmable logic arrays and sequential networks for testability; and (3) Design of fault tolerant multiprocessor network architectures. Some titles of the resulting papers are: Sequential network design using extra inputs for fault detection; A class of unidirectional error correcting codes; A uniform representation of permutation networks used in memory processor interconnections; and A fault tolerant communication architecture for distributed systems.

**DESCRIPTORS:** (U) \*Fault tolerant computing. Networks. Permutations. Read only memories. Circuit interconnections. Memory devices. Error correction codes. Multiprocessors

**IDENTIFIERS:** (U) PEB1102F, MUAFOSR2304AB

**ABSTRACT:** (U) During this period research was continued on the development and application of numerical methods for singularly-perturbed (or stiff) boundary value problems for ordinary differential equations and initial-boundary value problems for partial differential equations. The author concentrated most heavily on extensions to the adaptive finite element methods for partial differential equations. In particular, the stability of several mesh moving schemes was analyzed and local refinement techniques developed. The author also has some encouraging preliminary results on mesh moving methods in two dimensions. The investigators are applying their methods to several interesting physical problems, such as elastic-plastic solids, combustion, and a nonlinear Schrodinger equation which exhibits self focusing. (Author)

**DESCRIPTORS:** (U) \*Boundary value problems. \*Numerical methods and procedures. Finite element analysis. Differential equations. Partial differential equations. Perturbation theory

**IDENTIFIERS:** (U) Mesh moving methods. PEB1102F, MUAFOSR2304AB

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	DTIC REPORT BIBLIOGRAPHY	SEARCH CONTROL NO.	EV198
AD-A145 638	12/1      5/1      9/2	AD-A145 638	20/9
BROWN UNIV	PROVIDENCE RI LEFSCHETZ CENTER FOR DYNAMICAL SYSTEMS	MICHIGAN UNIV	ANN ARBOR PARTICLE BEAM RESEARCH LAB
(U)	Control and Identification of Time Varying Systems.	(U)	Neutral Beam Interactions with Materials.
DESCRIPTIVE NOTE:	Interim rept. 30 Jun 83-29 Jun 84.	DESCRIPTIVE NOTE:	Annual rept. 1 Jun 83-31 May 84.
AUG 84	8P	JUN 84	82P
PERSONAL AUTHORS:	Pearson, A. E. ;	PERSONAL AUTHORS:	Ong, R. S. ; Duderstadt, J. J. ; Gilgenbach, R. M. ;
CONTRACT NO.	AFOSR-82-0230	CONTRACT NO.	AFOSR-80-0029
PROJECT NO.	2304	PROJECT NO.	2301
TASK NO.	A1	TASK NO.	A7
MONITOR:	AFOSR TR-84-0842	MONITOR:	AFOSR TR-84-0840

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) Current research is summarized for the parameter identification of a class of polynomial differential systems via the modulating function method. The underlying computations involve calculating a finite number of Fourier coefficients of the input-output data which can be determined using a fast Fourier transform algorithm. Current research is also described for devising stabilizing feedback control laws for a class of differential-delay systems using a spectral factorization of the state space.

**DESCRIPTORS:** (U) \*Numerical methods and procedures, \*Systems analysis, \*Input output processing, Parameters, Identifications, Computations, Polynomials, Control, Fast Fourier transforms, Coefficients, Feedback, Air Force research

**IDENTIFIERS:** (U) \*Time varying systems, Target acceleration, PEG1102F, WUAFOSR2304A1

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) A duopigatron has been used to accelerate ion and neutral beams of hydrogen, argon krypton, and xenon. An important class of ion source plasma instabilities has been investigated. The frequency of source plasma oscillations scale as the square root of ion mass. Ion extraction efficiencies for the various mass species show excellent agreement with theory in the transition from the space charge limited regime to the ion saturation regime. Displaced aperture grids with geometric focusing have been studied. Ruby laser ablation plasma experiments are underway and the ablation plasma parameters have been measured. Theoretical research has been directed towards developing analytic expressions for neutral beam stopping in solid matter in order to compare with ion beam stopping. A second part of the theoretical effort concerns coupling of three computational physics models to simulate the interaction between a neutral/ion beam with a target ablation plasma.

**DESCRIPTORS:** (U) \*Ion sources, \*Plasmas(Physics), \*Ion beams, Particle beams, Stability, Plasma oscillations, Ions, Mass, Interactions, Laser beams

**IDENTIFIERS:** (U) Duopigatron, Neutral beams

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY      SEARCH CONTROL NO. EVI198  
AD-A145 823      9/2      AD-A145 822      9/2  
UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF COMPUTER SCIENCE  
(U) Yearly Report for Programming Productivity Enhancement by the Use of Application Generators.

DESCRIPTIVE NOTE: Interim rept. 1 Jun 83-31 May 84.

AUG 84      5P

PERSONAL AUTHORS: Horowitz, E. ;

CONTRACT NO. AFOSR-82-0232

PROJECT NO. 2304

TASK NO. A2

MONITOR: AFOSR TR-84-0813

UNCLASSIFIED REPORT

ABSTRACT: (U) During this period the investigator produced three papers with titles, AdaRel --- A relational extension of Ada. The design of office information systems, and High-level input-output facilities in database programming language. (Author)

DESCRIPTORS: (U) \*Computer programming, \*Computer applications, \*Productivity, Data bases, Interactions, Information systems, Automation, Man computer interface, Programming languages

IDENTIFIERS: (U) Ada language, AdaRel, MUAFOSR2304A2, PE81102F

STANFORD UNIV CA DEPT OF COMPUTER SCIENCE  
(U) On 'Update Semantics and Relational Views'.  
DESCRIPTIVE NOTE: Technical rept..

84      3P

PERSONAL AUTHORS: Keller, A. M. ;

CONTRACT NO. AFOSR-80-0212

PROJECT NO. 2304

TASK NO. A7

MONITOR: AFOSR TR-84-0710

UNCLASSIFIED REPORT

ABSTRACT: (U) A shared database encompasses data of interest to a variety of users. A database view provides a class of users with an image of a portion of the data presented according to the needs of these users. The ability to translate updates specified against the view into updates specified against the database is necessary to allow more effective use of views. Since a user accessing the database through a view has limited knowledge of the entire domain of the database, it is necessary to limit the effect on others of a particular user's view update. Furthermore, there may be many ways to translate a particular view update into database updates. Bancilhon and Spyros propose the notion of a constant complementary view, which partially solves the problem of view updates by addressing these two issues. The authors present a reasonable view update translator that does not preserve any complement. This illustrates the restrictive consequences of the requirement that a complement remain constant. (Author)

DESCRIPTORS: (U) \*Data bases, \*Semantics, \*Forecasting, Data management, Theory, Translations, Sharing

IDENTIFIERS: (U) PE81102F

AD-A145 823

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## DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI19B

AD-A145 616 12/1

FLORIDA STATE UNIV TALLAHASSEE

(U) Tests for Properties of Residual Life.  
83 15P

PERSONAL AUTHORS: Joe, H. ; Porschman, F. ;

CONTRACT NO. F49620-82-K-0007

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR  
TR-84-0664

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Communications in Statistics  
Theory and Methods, v12 n10 p1121-1134 1983.

Reprint: Tests for Properties of Residual Life.

DESCRIPTORS: (U) \*Residuals, \*Statistical tests,  
\*Distribution functions, Statistical inference,  
Survival(General). ReprintsIDENTIFIERS: (U) \*Residual life functions, WUAFOSR2304A5,  
PE01102F

AD-A145 615 12/1

PITTSBURGH UNIV PA CENTER FOR MULTIVARIATE ANALYSIS

(U) Weighted Distributions Arising Out of Methods of  
Ascertainment.

DESCRIPTIVE NOTE: Technical rept..

JUL 84 4SP

PERSONAL AUTHORS: Rao, C. R. ;

REPORT NO. TR-84-38

CONTRACT NO. F49620-82-K-0001

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR  
TR-84-0829

## UNCLASSIFIED REPORT

ABSTRACT: (U) The concept of weighted distributions can be traced to the study of the effects of methods of ascertainment upon the estimation of frequencies by Fisher in 1934, and it was formulated in general terms by the author in a paper presented at the first International Symposium on Classical and Continguous Distributions held in Montreal in 1963. Since then, a number of papers have appeared on the subject. This paper reviews some previous work, points out, through appropriate examples, some situations where weighted distributions arise and discusses the associated methods of statistical analysis. The importance of specification of the class of underlying probability distributions (or stochastic model) in data analysis based on a detailed knowledge of how data are obtained is emphasized. Failure to take into account the conditions of ascertainment of data can lead to wrong conclusions.

DESCRIPTORS: (U) \*Weighting functions, \*Distribution functions, Statistical analysis, Probability distribution functions, Mathematical models, Sampling, Truncation, Population(Mathematics), Data acquisition, Tables(Data).

IDENTIFIERS: (U) \*Weighted distributions, WUAFOSR2304A5,  
PE01102F

AD-A145 616

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AD-A145 814 12/1 DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVI19B  
 NORTH CAROLINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC AD-A145 813 5/1 13/8 15/5  
 PROCESSES CARNegie-MELLON UNIV PITTSBURGH PA ROBOTICS INST  
 (U) Estimation in Nonlinear Time Series Models I:  
 Stationary Series.

DESCRIPTIVE NOTE: Technical rept..  
 JUL 80 41P PERSONAL AUTHORS: Tjoestheim, D. ;  
 REPORT NO. TR-70 CONTRACT NO. F49620-82-C-0009  
 CONTRACT NO. F49620-82-K-0017  
 PROJECT NO. 2304 PROJECT NO. 2304  
 TASK NO. A5 MONITOR: AFOSR TR-84-0828  
 MONITOR: AFOSR TR-84-0828

## UNCLASSIFIED REPORT

ABSTRACT: (U) A general framework for analyzing estimates in nonlinear time series models is developed. Ergodic strictly stationary series are treated. General conditions for strong consistency and asymptotic normality are derived both for conditional least squares and maximum likelihood type estimates. Examples are taken from exponential, autoregressive, random coefficient autoregressive and bilinear time series models. Some nonstationary models and examples are treated in a sequel to this paper. (Author)

DESCRIPTORS: (U) \*Time series analysis, Asymptotic normality, Least squares method, Estimates, Mathematical models

IDENTIFIERS: (U) Likelihood estimation, PEG1102F,  
 MUAFOSR2304A5

ABSTRACT: (U) This report summarizes the progress of research performed during the contract period from March 1982 to March 1984. A theory of hierarchical, opportunistic constraint-directed reasoning for the scheduling of job shops has been the focus of the research. In addition, new research in the areas of constraint-directed diagnosis, and reactive scheduling was initiated. An experimental software system, called ISIS, has continued its evolution and has been tested on simulated plant data.

DESCRIPTORS: (U) \*Scheduling, \*Shops(Work areas), \*Logistics support, \*Artificial intelligence, Operations research, Jobs, Manufacturing, Computer programs, Air Force research

IDENTIFIERS: (U) Job shops, ISIS computer program,  
 MUAFOSR2304A2, PE81102F

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI19B

AD-A145 812

9/2

5/9

YALE UNIV NEW HAVEN CT DEPT OF COMPUTER SCIENCE

(U) Memory-Based Expert Systems.

DESCRIPTIVE NOTE: Interim rept. 15 Jan 83-14 Jan 84.

AUG 84

11P

PERSONAL AUTHORS: Schank, R. C. ;

CONTRACT NO. F49620-82-K-0010

PROJECT NO. 2304

TASK NO. A2

MONITOR: AFOSR  
TR-84-0814

UNCLASSIFIED REPORT

ABSTRACT: (U) During this period the investigators produced four papers with titles including, knowledge reorganization and reasoning style, Assignment of responsibility in ethical judgments, Generating hypotheses to explain prediction failures, and Learning, explanation, and a little history. They are developing a model of expertise that more closely resembles the way in which humans become experts, namely, through experience. They assume that the rule-base is not the primary repository of knowledge, but rather rules are derived from experience. Their model addresses the three problems given above as follows. (1) The knowledge-base is derived primarily from the enumeration of specific cases or experiences. They have found that a human expert is much more capable of recalling experiences than articulating internal rules. They suggest that the reason for this difference is that the human expert may not in fact be using rules in the first place. (2) As problems are presented to the system for which no specific case or rule can match exactly, the system can reason from more general similarities to compute up with an answer. This second level of reasoning should more closely resemble human problem solving behavior when people are confronted with novel situations. (3) A connection to this method is automatic learning. The system's memory of experiences will be changed and augmented by each additional case that is presented. The system will remember the problems that it has encountered and use that information to solve

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future problems. These three principles of the memory-based expert systems model are being tested in several related projects.

DESCRIPTORS: (U) \*Artificial intelligence, \*Learning, \*Reasoning, Behavior, Economic models, Automatic, Interpreters, Computer programming, Data acquisition, Memory devices, Humans, Hypotheses, Predictions

IDENTIFIERS: (U) \*Expert system, Experienced personnel, WUAFOSR2304A2, PEG1102F

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	DTIC REPORT BIBLIOGRAPHY	SEARCH CONTROL NO.	EVI19B
AD-A145 809	12/1	AD-A145 808	12/1
17/2			
NORTH CAROLINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC PROCESSES			
(U) On the Rate of Mean Convergence of Finite Linear Predictors of Multivariate Stationary Stochastic Processes.			
DESCRIPTIVE NOTE: Technical rept.,			
JUL 84	23P	AUG 84	77P
PERSONAL AUTHORS:	Pourahmadi, M. ;	PERSONAL AUTHORS:	Levis, A. H. ;
REPORT NO.	TR-89	REPORT NO.	LIDS-FR-1393
CONTRACT NO.	F49620-82-C-0008	CONTRACT NO.	AFOSR-80-0229
PROJECT NO.	2304	PROJECT NO.	2304
TASK NO.	A6	TASK NO.	A6
MONITOR:	AFOSR TR-84-0825	MONITOR:	AFOSR TR-84-0830

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) This document considers a multivariate weakly stationary stochastic process ( $X_{\text{sub } n}$ ) with the spectral density matrix  $f$  satisfying the boundedness condition. It is shown that if the entries of  $f$  are analytic functions of theta on  $[-\pi, \pi]$ , then the rate of convergence of the one-step ahead linear least squares predictor of ( $X_{\text{sub } n}$ ) based on a finite segment of the past, and the partial sum of the infinite linear least squares predictor of the process to the Kolmogorov-Wiener predictor is at least exponential. (Author)

**DESCRIPTORS:** (U) \*Stochastic processes, \*Multivariate analysis, \*Mathematical prediction, \*Convergence, Mean, Linearity, Stationary, Matrices(Mathematics), Exponential functions, Rates, Analytic functions, Least squares method

**IDENTIFIERS:** (U) WUAFOSR2304AS, PEG1102F

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI19B

MASSACHUSETTS INST OF TECH CAMBRIDGE LAB FOR INFORMATION AND DECISION SYSTEMS

(U) A Mathematical Theory of Command and Control Structures.

DESCRIPTIVE NOTE: Final rept. 1 Jul 83-30 Jun 84.

DESCRIPTIVE NOTE: Technical rept.,

JUL 84 23P

PERSONAL AUTHORS: Pourahmadi, M. ;

REPORT NO. TR-89

CONTRACT NO. F49620-82-C-0008

PROJECT NO. 2304

TASK NO. A6

MONITOR: AFOSR

TR-84-0825

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) The elements of a mathematical theory for the analysis and design of organizations are presented. The focus of the research has been on information processing and decisionmakers organizations supported by Command Control and Communications(C3) systems. The mathematical framework used in modelling the individual decisionmakers, as well as the organization, is that of n-dimensional information theory. Petri Net representation of the organizational structure is used to model the interactions between organization members as well as their interactions with the C3 system. Comparison and evaluation of alternative organizational forms is accomplished by considering organizational performance, individual workload and the sets of satisfying decision strategies. A brief description of research on distributed estimation and on information storage and flow in C3 systems is also included.

**DESCRIPTORS:** (U) \*Mathematics, \*Theory, \*Command and control systems, Information processing, Decision making, Information theory, Data storage systems, Organizations, Interactions, Air Force research, Tactical communications, Models, Preprocessing

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SEARCH CONTROL NO. EVI19B

IDENTIFIERS: (U) C3(Command Control and Communications),  
MJAFOFSR2304, PEB1102F

AD-A145 579

14/2

SOUTH CAROLINA UNIV COLUMBIA DEPT OF MATHEMATICS AND  
STATISTICS

(U) On Discrete Failure Models.

DESCRIPTIVE NOTE: Technical rept..

JUL 84 21P

PERSONAL AUTHORS: Padgett, W. J.; Spurrier, J. D.;

REPORT NO. TR-97, 82N05-10

CONTRACT NO. AFOSR-84-0156

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR  
TR-84-0887

UNCLASSIFIED REPORT

ABSTRACT: (U) In some situations, discrete failure time distributions are more appropriate to model lifetimes than continuous distributions. Very few results for the discrete case have been given in the literature. This paper provides three families of discrete parametric lifetime distribution which are quite versatile in fitting Increasing Failure Rate (IFR) and Decreasing Failure Rate (DFR), and constant failure rate models to either uncensored or right-censored life-test data. The maximum likelihood estimation (MLE) of parameters, survival probabilities, and mean lifetimes is investigated, and the MLEs are shown to be easily computed by simple numerical methods. An example is given for each of the models, allowing the comparison of the proposed models. The example illustrates that the discrete models presented can provide a better fit to discrete data than previously proposed discrete distributions.

DESCRIPTORS: (U) \*Failure, \*Mathematical models, Life tests

IDENTIFIERS: (U) \*Discrete failure models, PEB1102F,  
MJAFOFSR2304A5

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SEARCH CONTROL NO. EVI19B

AD-A145 570 9/3 12/1

NORTHEASTERN UNIV BOSTON MA

(U) Asynchronous Discrete Control of Continuous Processes.

DESCRIPTIVE NOTE: Annual rept. 1 Jul 83-30 Jun 84.

JUL 84 12P

PERSONAL AUTHORS: Kaliski, M. E.; Johnson, T. L. ;

CONTRACT NO. F49620-82-C-0080

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR

TR-84-0854

DESCRIPTIVE NOTE: Technical rept..

JUN 84 19P

PERSONAL AUTHORS: Lubecke, A. M.; Partlett, W. J. ;

REPORT NO. TR-88, 82G05-9

CONTRACT NO. AFOSR-84-0156

PROJECT NO. 2304

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) The research during this second contract year continued to deal with the development of sound theoretical models for asynchronous systems. Two criteria served to shape the research pursued: the first, that the developed models extend and generalize previously developed research for synchronous discrete control; the second, that the models explicitly address the question of how to incorporate system transition times into themselves. The following sections of this report concisely delineate this year's work. Our original proposal for this research identified four general tasks of investigation: (1.1) Analysis of Qualitative Properties of Asynchronous Hybrid Systems; (1.2) Acceptance and Control for Asynchronous Hybrid Systems.

**DESCRIPTORS:** (U) \*Asynchronous systems, \*Control theory, \*Numerical methods and procedures, Continuous processing, Coding, Feedback, Hybrid systems, Stochastic control, Real time

**IDENTIFIERS:** (U) PE81102F, MUAFOSR2304A1

AD-A145 569 12/1

SOUTH CAROLINA UNIV COLUMBIA DEPT OF MATHEMATICS AND STATISTICS

(U) Nonparametric Maximum Penalized Likelihood Estimation of a Density from Arbitrarily Right-Censored Observations.

DESCRIPTIVE NOTE: Technical rept..

JUN 84 19P

PERSONAL AUTHORS: Lubecke, A. M.; Partlett, W. J. ;

REPORT NO. TR-88, 82G05-9

CONTRACT NO. AFOSR-84-0156

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR  
TR-84-0858

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) Based on arbitrarily right-censored observations from a probability density function  $f$  deg., the existence and uniqueness of the maximum penalized likelihood estimator (MPLE) of  $f$  deg. is proven. In particular, the first MPLE of Good and Gaskins of a density defined on  $(0, \infty)$  is shown to exist and to be unique under arbitrary right-censorship. Furthermore, the MPLE is in the form of an exponential spline which knots at the observed censored and uncensored data points. (Author)

**DESCRIPTORS:** (U) \*Nonparametric statistics, Probability density functions, Data bases, Theorems

**IDENTIFIERS:** (U) MPLE (Maximum Penalized Likelihood Estimation), Likelihood estimation, PE81102F, MUAFOSR2304A5

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## DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI19B

AD-A145 557 12/1 9/2

## STANFORD UNIV CA DEPT OF COMPUTER SCIENCE

(U) On Complementary and Independent Mappings on Databases.

DESCRIPTIVE NOTE: Technical rept..

84 7P

PERSONAL AUTHORS: Keller, A. H. ; Ultman, J. D. ;  
 CONTRACT NO. AFOSR-80-0212, N00039-82-G-0250  
 PROJECT NO. 2304  
 TASK NO. A7  
 MONITOR: AFOSR TR-84-0708

## UNCLASSIFIED REPORT

ABSTRACT: (U) This document defines the notion of independent views to indicate whether the range values of the two views may be achieved independently. The concepts of complementary views indicates when the domain element can be uniquely determined by the range values of the two complementary views. The relationship between independent and complementary views is considered. In unrestricted domains, a view (but not the identify or empty view) can have more than one complementary, independent view. Databases, however, are more restricted domains: They are finite power sets. A view is monotonic if it preserves inclusion. However, in finite power sets when all views are monotonic, if a given view has another view which is independent and complementary, then this view is unique.

DESCRIPTORS: (U) \*Mapping, \*Monotone functions, \*Data bases, Theory, Translators, Modification

IDENTIFIERS: (U) \*Relational data bases, Power sets, PE81102F, MUAFOSR2304A7

DTIC REPORT BIBLIOGRAPHY  
SEARCH CONTROL NO. EVI19B  
AD-A145 556 12/1  
WASHINGTON STATE UNIV PULLMAN DEPT OF PURE AND APPLIED  
MATHEMATICS

(U) Rapidly Convergent Algorithms for Nonsmooth Optimization.

DESCRIPTIVE NOTE: Interim scientific rept.. 15 Jul 83-14  
JUL 84

PERSONAL AUTHORS: Mifflin, R. ;  
 CONTRACT NO. AFOSR-83-0210  
 PROJECT NO. 2304  
 TASK NO. A1  
 MONITOR: AFOSR TR-84-0727

## UNCLASSIFIED REPORT

ABSTRACT: (U) This research has led to new developments for solving nonlinear optimization problems involving functions that are not everywhere differentiable and/or are implicitly defined. For the single variable case a method has been given which combined polyhedral and quadratic approximation, and automatic scale-free penalty technique and a safeguard that insures convergence to a stationary point, but does not detract from rapid convergence. Under relatively weak convergence rate assumptions the algorithm exhibits a new type of better than linear convergence. The safeguard also has the practical advantage of keeping apart points that are used in denominators of difference quotients for approximating second derivatives. A practical single resource allocation problem with several bounded decision variables has been solved very efficiently via a dual technique that used the single variable method in a nested manner to solve both the outer dual problem and the inner Lagrangian subproblems. The new concept of better than linear convergence form the single variable case has been generalized to the multivariable case. Author supplied key words also include; constrained minimization, and line search.

DESCRIPTORS: (U) \*Optimization, \*Convergence, Algorithms.

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Non linear analysis

IDENTIFIERS: (U) PEB1102F. WUAFOSR2304A1

AD-A145 555 12/2

MASSACHUSETTS UNIV AMHERST DEPT OF MATHEMATICS AND  
STATISTICS

(U) Applications of Functional Analytic and Martingale  
Methods.

DESCRIPTIVE NOTE: Annual scientific rept. 15 May 83-14  
May 84.

JUL 84 4P

PERSONAL AUTHORS: Rosserkrantz, W. A. :

CONTRACT NO. AFOSR-82-0167

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR  
TR-84-0718

**UNCLASSIFIED REPORT**

ABSTRACT: (U) This annual report surveys and summarizes  
the principal investigator's current research on modeling  
and analysis of various random access protocols via  
Martingale and functional analytical methods. (Author)

DESCRIPTORS: (U) \*Queueing theory, Stochastic processes,  
Problem solving, Random variables, Functional analysis,  
Research management

IDENTIFIERS: (U) Martingales, PEB1102F, WUAFOSR2304A5

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NORTH CAROLINA UNIV AT CHARLOTTE DEPT OF MATHEMATICS			STATE UNIV OF NEW YORK AT BUFFALO AMHERST DEPT OF MECHANICAL AND AEROSPACE ENGINEERING			
(U) Life Distribution Properties of Devices Subject to Deterioration. Research Progress.			(U) Qualitative Results for Distributed Systems with Discrete Damping and Stiffness with Application to Control.			
DESCRIPTIVE NOTE: Interim scientific rept. 1 Jul 83-30 Jun 84.			DESCRIPTIVE NOTE: Interim rept. 1 Jul 83-30 Jun 84.			
JUL 84	13P		JUL 84	9P		
PERSONAL AUTHORS: Abdell-Hameed, M. ;			PERSONAL AUTHORS: Irmam, D. J. ;			
CONTRACT NO. AFOSR-80-0245			CONTRACT NO. AFOSR-82-0242			
PROJECT NO. 2304			PROJECT NO. 2304			
TASK NO. A5			TASK NO. A1			MONITOR: AFOSR

LINEAR ASSISTED AFFINAT

**ABSTRACT:** (U) Research during this period concentrated on the following areas: (1) life distribution properties of devices subject to a pure jump damage process; (2) a power transformation exponential regression model for censored failure time data; (3) stability of optimal replacement problems; (4) an iterative scheme for approximating optimal replacement policies; and (5) stability of optimal stopping problems. This report summarizes progress in these areas. (Author)

<b>DESCRIPTORS:</b>	(U) *Research management, *Mathematics, *Computers, Mathematical models, Distribution function Exponential functions, Regression analysis, Optimization Placement, Stability, Iterations
<b>IDENTIFIERS:</b>	(U) Life distribution properties. PEG111

WOMEN'S SENSES AND

IDENTIFICATION: (III) MIAF0803320101 DE01102E

UNCLASSIFIED REPORT

**ABSTRACT:** (U) Distributed parameter models of large flexible space structures subject to various control techniques have been studied. The main thrust has been to develop qualitative results which are independent of truncation or discretization approaches by treating the fully distributed model. Emphasis has been on controlling the transient response of non-conservative linear partial differential equation models of such structures subject to a few recent advances. (Author)

**DESCRIPTORS:** (U) \*Vibration. \*Damping. \*Aerospace systems. \*Partial differential equations. Parametric analysis. Distribution. Feedback. Linear systems. Convergence. Flexible structures. Stability. Qualitative analysis.

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## DTIC REPORT BIBLIOGRAPHY

AD-A145 508 20/12 11/8

PARTS-6 UNIV (FRANCE) LABORATOIRE D'OPTIQUE DES SOLIDES

(U) Relationships between Electronic Structure and Stability of Metallic Glasses.

DESCRIPTIVE NOTE: Final scientific rept. 1 Jan-31 Dec 83.

JUN 84 41P PERSONAL AUTHORS: Abeles, F. ; Theye, M. L. ; Nguyen Van, V. ;

CONTRACT NO. AFOSR-83-0080

PROJECT NO. 2308

TASK NO. C3

MONITOR: AFOSR TR-84-0705

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) Amorphous MgZn alloys have been obtained in the form of thin films by co-evaporation under ultra-high vacuum on cold sapphire substrates (> approx. 10K), for Zn concentrations between 25 and 35 at.%. These films crystallize at about 350K. Their d.c. electrical resistivity and their optical properties between 0.8 and 4 ev have been investigated *in situ*. The resistivity versus temperature behaviour is roughly similar to that reported for quenched bulk alloys but the resistivity values are significantly larger. The complex dielectric constant follows the free-electron Drude model at low energies up to 1.8 ev. The optical free electron parameters are discussed and compared to those obtained on other free-electron-like amorphous alloys. Special attention is paid to the average effective number of conduction electrons per atom, which is found to be smaller than expected. (Author)

**DESCRIPTORS:** (U) Electrons. Magnesium alloys. Zinc alloys. Amorphous materials. Electrical properties. Metal films. Thin films. Electrical resistance

**IDENTIFIERS:** (U) \*E1 electronic structure. PEG1102F. MUAFOSR2308C3

## SEARCH CONTROL NO. EVI19B

AD-A145 505 12/1

FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS

(U) Computing the Reliability of k out of n Systems. Stability of Metallic Glasses.

DESCRIPTIVE NOTE: Technical rept.,

OCT 83 14P

PERSONAL AUTHORS: Boland, P. J. ; Proschak, F. ;

CONTRACT NO. F49620-82-K-0007

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR

TR-84-0715

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) This document surveys some of the more important theoretical results about the structure of the reliability function of a k out of n system, and indicates how these results may be used to obtain easily calculable bounds for the reliability of a specified k out of n system. (Author)

**DESCRIPTORS:** (U) Statistical functions. Systems analysis. Reliability. Theorems

**IDENTIFIERS:** (U) Reliability functions. MUAFOSR2304A5. PEG1102F

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## CALIFORNIA UNIV BERKELEY OPERATIONS RESEARCH CENTER

(U) Interim Scientific Report, Grant AFOSR-81-0122, 1 June 1983 - 31 May 1984,

JUL 84 11P

PERSONAL AUTHORS: Barlow, R. E. ;

CONTRACT NO. AFOSR-81-0122

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR  
TR-84-0728

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) The report summarizes research during this period supported by the grant. Topics covered include system reliability, determining sample size for life test experiments, data extractions procedures, and acceptance sampling procedures. Abstracts of papers written during this period are included. (Author)

**DESCRIPTORS:** (U) \*Research management, \*Abstracts, Systems management, Reliability, Sampling, Life tests, Data management, Air Force research, Grants

**IDENTIFIERS:** (U) PE81102F, MUAFOSR2304A5

## SEARCH CONTROL NO. EVI19B

AD-A145 498 12/1

## NORTH CAROLINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC PROCESSES

(U) Limit Theory for the Sample Covariance and Correlation Functions of Moving Averages.

**DESCRIPTIVE NOTE:** Technical rept..

JUL 84 36P

**PERSONAL AUTHORS:** Davis, R. ; Resnick, S. ;**REPORT NO.** TR-88**CONTRACT NO.** F49620-82-C-0009, NSF-DMS82-023335**PROJECT NO.** 2304**TASK NO.** A5**MONITOR:** AFOSR  
TR-84-0745

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) Document describes a moving average process which have regularly varying tail probabilities with index  $\alpha > 0$ . The limit distribution of the sample covariance function is derived in the case that the process has a finite variance but an infinite variance but an infinite fourth moment. Furthermore, in the infinite variance case ( $0 < \alpha < 2$ ), the sample correlation function is shown to converge in distribution to the ratio of two independent stable random variables with indices  $\alpha$  and  $\alpha/2$ , respectively. This result immediately gives the limit distribution for the least squares estimates of the parameters in an autoregressive process. (Author)

**DESCRIPTORS:** (U) \*Functions (Mathematics), \*Covariance, \*Correlation techniques, Convergence, Random variables, Least squares method, Estimates, Parameters, Regression analysis, Variations, Stochastic processes

**IDENTIFIERS:** (U) Moving averages, PE81102F,  
MUAFOSR2304A5

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OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS

(U) Molecular Interactions of High Energy Fuels and Jet  
Fuels with Oncogenic Viruses and Endogenous Viruses.

DESCRIPTIVE NOTE: Final rept. 1 JUL 80-30 Sep 83.

MAY 84      147P

PERSONAL AUTHOR(S): Blakeslee, J. R., Jr.

CONTRACT NO. F49620-80-C-0087

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR  
TR-84-0720

UNCLASSIFIED REPORT

ABSTRACT: (U) The objectives of this research were to develop rapid in-vitro assays, to evaluate the carcinogenic potential of chemicals used by the U.S. Air Force. Snyder-Thielon Feline Sarcoma Virus (ST-FESV), quantitatively transforms human skin fibroblasts following second order kinetics. These studies were performed in order to determine whether chemicals altered ST-FESV transformation in a predictable manner and to correlate the alteration with the carcinogenic or non-carcinogenic activity of the test chemical. The results, to date, show diverse carcinogens classed as: aromatic amines, polycyclic hydrocarbons, amino fluorenes, hydrazines, asbestos and mycotoxins inhibited virus transformation when virus infected cells (2 hours post-infection) were exposed to test chemical, while non-carcinogenic chemicals had no significant effect on transformation. Triton X-100, acetone, petroleum and shale oil derived JEG; Rus and diesel fuel, marine demonstrated non-carcinogenic activity while formalin demonstrated carcinogenic activity. Experiments designed to show the specificity of the antagonistic effect of known carcinogens are reported.

DESCRIPTORS: (U) \*Carcinogens, \*Fuels, \*Jet engine fuels,  
\*Viruses, \*Oncogenic viruses, \*Bioassay, Molecules,  
Interactions, Chemicals, Fibroblasts, Skin(Anatomy),  
Humans, Organic compounds, Dosage, Tables(Data)

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## CALIFORNIA UNIV SANTA BARBARA QUANTUM INST

GEORGIA INST OF TECH ATLANTA SCHOOL OF CHEMICAL  
ENGINEERING(U) Summary Discussion: Theoretical Aspects of XUV Free  
Electron Lasers.

DESCRIPTIVE NOTE: Technical rept..

DEC 83 7P

JUL 84 72P

PERSONAL AUTHORS: Colson, W. B.; Becker, W.; Benson, S.;  
Bhowmik, A.; Cover, R.;

CONTRACT NO. F49620-83-C-0043, N00014-81-K-0809

PROJECT NO. 2301

CONTRACT NO. AFOSR-83-0182

TASK NO. A1

PROJECT NO. 2307

MONITOR: AFOSR

TR-84-0747

TASK NO. D9

MONITOR: AFOSR

TR-84-0747

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) We briefly summarize the existing knowledge on xuv operation of Free-Electron Lasers. The standard classical analysis is valid until about 1 Angstrom wavelength if a high energy electron beam is used. If a low energy beam is used, the limiting wavelength is larger. Other topics discussed are electron shot noise, photon statistics, photon and electron quantum effects, coherence, high-gain collective effects, higher harmonics, and transverse optical effects. (Author)

**DESCRIPTORS:** (U) \*Free electrons, \*Lasers, Frequency, Limitations, Ultraviolet radiation, Electron beams, High energy, High gain

**IDENTIFIERS:** (U) \*Free electron lasers

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) Small particles and droplets encounter normal shocks in a variety of applications. The particle-shock interaction subjects the particles to large unsteady drag forces behind the shock front. In this paper, an analysis has been made of the relative importance of the Basset history integral for particle displacement and velocity behind a normal shock wave. The effect of the Basset integral has been related to gas stagnation conditions and the local gas Mach number. In the present theoretical study it has been demonstrated that the particle velocity and displacement relative to the gas back of the shock is unaffected by the inclusion of the Basset term until the latter stages of particle relaxation. The effect of the Basset history integral, which results from diffusion of vorticity from the decelerating particle, has been shown to decrease the particle drag or increase the displacement of the particle back of the shock. The effect is magnified with increasing stagnation pressures and particle diameters but with decreasing gas stagnation temperatures.

**DESCRIPTORS:** (U) \*Aerodynamic drag, \*Shock waves, \*Particle flux, \*Numerical analysis, Displacement, Nozzle gas flow, Stagnation pressure, Mach number, Particle size, Relaxation, Unsteady flow

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AD-A145 445      8/18

IDENTIFIERS: (U) \*Basset Integral, WUAFOSR230709,  
PES1102F

VIRGINIA MASON RESEARCH CENTER SEATTLE WA

(U) Interaction of Anti-G Measures and Chest Wall  
Mechanics in Determining Gas Exchange.

DESCRIPTIVE NOTE: Final rept. 1 Apr 81-31 Mar 84.

JUN 83 92P

PERSONAL AUTHORS: Model, H. I. :

CONTRACT NO. F49620-81-C-0055

PROJECT NO. 2312

TASK NO. A1

MONITOR: AFOSR  
TR-84-0751

**UNCLASSIFIED REPORT**

ABSTRACT: (U) This project represents an extension of an earlier project designed to examine factors influencing gas exchange during acceleration stress. Included in this report are studies dealing with the influence of the chest wall on regional intrapleural pressure during +Gz stress; influence of G-suit abdominal bladder inflation on gas exchange during +Gz stress; influence of the chest wall on gas exchange during mechanical ventilation; characterization of in vivo pressure-volume relationships of the pig's respiratory system; and mechanics of the pulmonary vasculature. Results indicate that the chest wall plays a significant role in determining gas exchange parameters during +Gz stress, during application of protective measures and during mechanical ventilation. (Author)

DESCRIPTORS: (U) \*Thorax, \*Gas exchange(Biology),  
\*Acceleration, Stresses, Mechanics, Respiratory system,  
Walls, G suits

IDENTIFIERS: (U) WUAFOSR2312A1, PEB11026

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AD-A145 444 8/18

HARVARD MEDICAL SCHOOL BOSTON MA DEPT OF PHYSIOLOGY AND BIOPHYSICS

(U) Jet Lag Prevention: Physiological Mechanisms and Pharmacological Therapy.

DESCRIPTIVE NOTE: Final scientific rept. 1 Apr 78-31 Mar 83.

MAR 84 17P

PERSONAL AUTHORS: Moore-Ede, M. C. :

CONTRACT NO. AFOSR-78-3500

PROJECT NO. 2312

TASK NO. A1

MONITOR: AFOSR TR-84-0752

## UNCLASSIFIED REPORT

Availability: Document partially illegible.

**ABSTRACT:** (U) This research program was concerned with the physiological mechanisms that underlie the phenomenon of jet-lag and was aimed at developing therapeutic techniques to minimize the performance and physiological deficits that occur in rapid transmeridian air travel. During the course of this project, the circadian pacemaker responsible for the timing of the daily rest-activity was identified in the brain of the diurnal primate, the squirrel monkey (*Saimiri sciureus*). The suprachiasmatic nuclei were also identified in the human brain. A number of other significant advances included: developing a model of the circadian sleep-wake cycle, characterizing how phase shifts of the light-dark cycle reset the timing of the sleep-wake cycle, and identifying pharmacological agents which can phase-reset the circadian system.

**DESCRIPTORS:** (U) \*Brain, Circadian rhythms, Travel, Jet aircraft, Physiology, Adaptation(Physiology)

IDENTIFIERS: (U) \*Jet lag, Sleep wake cycle

## UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EV119B

AD-A145 437 20/7

STEVENS INST OF TECH HOBOOKEN NJ

(U) Surface Production of Negative Hydrogen Ions.

DESCRIPTIVE NOTE: Annual scientific rept. 1 Jun 83-31 May 84.

JUN 84 29P

PERSONAL AUTHORS: Seidl, M. :

CONTRACT NO. AFOSR-83-0230

PROJECT NO. 2301

TASK NO. A7

MONITOR: AFOSR TR-84-0739

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) Production of negative hydrogen ions by sputtering adsorbed hydrogen from a molybdenum surface bombarded with cesium ions has been investigated. The negative hydrogen yield (number of negative hydrogen ions sputtered per incident cesium ion) is largest when the sputtering of the surface is minimized by appropriate cesium coverage. The yield has a maximum value of 0.5 at cesium ion energy of 750 eV and approaches zero at 150 eV cesium energy. The angular distribution of the hydrogen ions is close to a gaussian distribution with a standard deviation of 3 degrees, approximately independent of the bombarding energy. This means that the negative hydrogen ions have a Maxwellian distribution in parallel energies with a temperature between 0.3 to 0.5 percent of the bombarding energy.

**DESCRIPTORS:** (U) \*Hydrogen, \*Anions, Production, Sputtering, Ion sources, Impact, Emission, Ion bombardment, Cesium, Molybdenum

IDENTIFIERS: (U) WIAFOSR2301A7, PEB1102F

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## DTIC REPORT BIBLIOGRAPHY

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			AD-A145 424 9/2
<b>CALIFORNIA UNIV SANTA BARBARA</b>			MARYLAND UNIV COLLEGE PARK CENTER FOR AUTOMATION
(U) Spontaneous Radiation from Relativistic Electrons in a Taper Undulator.			(U) Parallel Searching and Merging on ZMOB.
DESCRIPTIVE NOTE: Technical rept..			DESCRIPTIVE NOTE: Technical rept..
JUN 83	12P		JUN 84 41P
PERSONAL AUTHORS:	Bosco, P. ; Colson, W. B. ;	PERSONAL AUTHORS:	Kasif, S. ;
CONTRACT NO.	F49620-83-C-0043	REPORT NO.	CAR-TR-84, CSC-TR-1405
PROJECT NO.	2301	CONTRACT NO.	F49620-83-C-0082
TASK NO.	A1	PROJECT NO.	2304
MONITOR:	AFOSR TR-84-0738	TASK NO.	A2
		MONITOR:	AFOSR TR-84-0746

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) The spectrum, angular distribution, polarization and coherence properties of the radiation emitted by relativistic electrons undulating through a quasi-periodic tapered magnetic field are studied. Tapering the wavelength and/or field strength along the undulator's axis has the effect of spreading the spectral line to higher frequencies; Interference over this broader spectral range results in a more complex line shape. The angular dependence, on the other hand, is not affected by the amount of taper. The polarization of the radiation in the forward direction is determined by the transverse polarization of the undulator, but the polarization changes off axis. The radiation patterns predicted here are distinct from those of untapered undulators, and their detection is now feasible. They will provide useful diagnostics of electron trajectories and threshold behavior in free-electron-laser oscillators using tapered undulators. (Author)

**DESCRIPTORS:** (U) \*Electron emission, \*Radiation Patterns, \*Equations, Magnetic fields, Taper, Electromagnetism, Bremsstrahlung, Trajectories, Polarization, Coherence, Predictions, Oscillators, Harmonics, Air Force personnel IDENTIFIERS: (U) Free electron lasers, \*Taper undulators, \*Undulators, Relativistic electrons, WUAFOSR2301A1, PEG1102F

AD-A145 430

SEARCH CONTROL NO. EVI19B  
AD-A145 424 9/2  
MARYLAND UNIV COLLEGE PARK CENTER FOR AUTOMATION

(U) Parallel Searching and Merging on ZMOB.

DESCRIPTIVE NOTE: Technical rept..

JUN 83 12P

Spontaneous Radiation from Relativistic Electrons in a Taper Undulator.

DESCRIPTIVE NOTE: Technical rept..

PERSONAL AUTHORS:

Bosco, P. ; Colson, W. B. ;  
PROJECT NO. F49620-83-C-0043

CONTRACT NO. 2301

TASK NO. A1

MONITOR: AFOSR

TR-84-0738

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) One of the most difficult issues that must be addressed when studying a class of parallel algorithms is the problem of choosing a model that captures the inherent difficulty of implementing these algorithms on a multiprocessor architecture. Shared memory models have proven to be an effective tool for deriving lower bounds on the complexity of comparison problems. In particular, a speed-up of  $\lg(P)$  is possible for the problem of finding an element in an  $N$ -element sorted list, and speed-ups of  $P \lg(P)$  and  $P$  are possible for merging  $N$ -element sorted lists of  $P$  processors for the cases  $N=P$  and  $P < N$  respectively. In practice, these speed-ups are not attainable since the shared memory models ignore many practical considerations in multiprocessor systems, such as interprocessor communications, distribution of data on local memories and limited fan-out of memory locations. In this paper we introduce a model for parallel computation that is strictly weaker than the shared memory models. The model is based on an actual machine currently being constructed (ZMOB). We examine the communication facilities available in the model and show that lower bounds for merging and searching on shared memory models are attainable (within a constant).

**DESCRIPTORS:** (U) \*Memory devices, \*Parallel processing.

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\*Memory devices, \*Parallel processing.

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Algorithms, Multiprocessors, Searching, Computer architecture  
IDENTIFIERS: (U) MUAFOSR2304A2, PEG1102F

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI19B

AD-A145 423 20/5 20/7

CALIFORNIA UNIV SANTA BARBARA

(U) Long Pulses and Sideband Instability in Free Electron Laser Oscillators.

DESCRIPTIVE NOTE: Technical; rept..

83 2P

PERSONAL AUTHORS: Freedman, R. A.; Colson, W. B.;

CONTRACT NO. F49620-83-C-0043, AFOSR-81-0061

PROJECT NO. 2301

TASK NO. A1

MONITOR: AFOSR TR-84-0738

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Bendor Free Electron Laser Conference, J. de Physique, v44 nC1-xx p1-2 1983.

Reprint: Long Pulses and Sideband Instability in Free Electron Laser Oscillators.

DESCRIPTORS: (U) \*Lasers, \*Electron beams, Nonlinear systems, Optics, Reprints

IDENTIFIERS: (U) Optical modes, FEL(Free Electron Lasers), Undulators, Slippage distance, MUAFOSR2301A1, PEG1102F

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DTIC REPORT BIBLIOGRAPHY		SEARCH CONTROL NO.	EVI19B
AD-A145 412	5/10	AD-A145 405	6/15
OREGON UNIV	EUGENE	BEN-GURION UNIV OF THE NEGEV BEERSHEBA (ISRAEL)	6/19
(U) Visual Representations Subserving Texture Perception.		(U) Effect of Exercise and Environmental Heat on Drug Kinetics.	
DESCRIPTIVE NOTE: Annual rept. no. 1, 30 Apr 83-1 May 84.		DESCRIPTIVE NOTE: Final scientific rept. 1 Feb 82-31 Jan 84.	
PERSONAL AUTHORS:	Beck, J.; Stevens, K. A. ;	JUN	84
CONTRACT NO.	F49620-83-C-0093	21P	
PROJECT NO.	2313	PERSONAL AUTHORS:	Danon, A. ;
TASK NO.	A5	CONTRACT NO.	AFOSR-82-0090
MONITOR:	AFOSR TR-84-0753	PROJECT NO.	2312
UNCLASSIFIED REPORT			

**ABSTRACT:** (U) The ongoing research investigates the representations of visual texture and the processes that detect discontinuities and structure in visual texture. Psychophysical experiments have investigated the salience of bar orientation and the effect of groupings in texture segmentation. We are examining the role of elongated receptive field mechanisms in computing both local measures of orientation and their possible role in texture segmentation. We have found such mechanisms, however, to be less appropriate for determining one-dimensional groupings of (collinear) discrete items of texture. Combined psychophysical and computational studies have provided evidence for place tokens in groupings, and current work is directed towards understanding how these tokens may be defined in fine-scale texture detail. To support this work, a vision laboratory has been established based on a Symbolics 3800 Lisp Machine. (Author)

**DESCRIPTORS:** (U) \*Visual perception, \*Texture, Psychophysics, Orientation(Direction), Discrimination, Test methods, Discontinuities, Detection, Optical detection

**IDENTIFIERS:** (U) \*Visual texture, Symbolics 3800 Lisp machine, WUAFOSR2313AS, PEB1102F

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## UNCLASSIFIED REPORT

**ABSTRACT:** (U) The effects of physical exercise and heat exposure on the pharmacokinetic behavior of some model drugs were investigated in normal volunteers. Drugs were chosen to represent particular kinetic processes. Exercise was mild to moderate and environmental temperature was either 22 C or 40 C. Under heat exposure and exercise, theophylline exhibited prolonged half-life and reduced clearance, suggesting the need for dosage adjustment in moderately active individuals. Exercise influenced digoxin kinetics by shortening the time to peak, probably by enhancing the drug's absorption. The plasma kinetics of quinidine were unchanged under exercise conditions. However, urinary excretion of the drug was significantly higher during exercise than at rest, and this correlated with increased urinary output during exercise. Exercise and heat exposure prolonged the time of distribution of intravenously administered propanolol, while other pharmacokinetic parameters relating to propanolol remained unchanged. The half-lives (T<sub>1/2</sub>) of both sulfamethoxazole and trimethoprim that were administered as co-trimoxazole were not significantly altered. The absorption of methylsalicylate that was applied on the skin was markedly influenced by the conditions tested. Thus, the amount of salicylate that was absorbed increased three fold while the subjects were exposed to either heat or exercise or both.

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**DTIC REPORT BIBLIOGRAPHY**

SEARCH CONTROL NO. EVI19B

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**DESCRIPTORS:** (U) \*Pharmacokinetics, \*Drugs,  
\*Exercise(Physiology), Heart, Exposure(Physiology)  
**IDENTIFIERS:** (U) Theophyllin, Digoxin, Quinidine,  
Propranolol, Methylsalicylate, Trimoxazole, PEG1102F,  
WUAFOSR2312A1

CALIFORNIA UNIV SANTA BARBARA

(U) Synchrotron Instability for Long Pulses in Free  
Electron Laser Oscillators.

**DESCRIPTIVE NOTE:** Technical rept.,

83      8P

**PERSONAL AUTHORS:** Colson, W. B.; Freedman, R. ;

CONTRACT NO. F49620-83-C-0043

PROJECT NO. 2301

TASK NO. A1

MONITOR: AFOSR  
TR-84-0735

**UNCLASSIFIED REPORT**

**SUPPLEMENTARY NOTE:** Pub. In Optics Communications, v46  
n37 p1-13 1983.

**Reprint:** Synchrotron Instability for Long Pulses in Free  
Electron Laser Oscillators.

**DESCRIPTORS:** (U) \*Oscillators, \*Laser applications,  
Light pulses, Equations, Optics, Synchrotrons, Air Force  
research, Reprints

**IDENTIFIERS:** (U) Free electron lasers, PEG1102F,  
WUAFOSR2301A1

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UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF  
MATHEMATICS

(U) Inverse Problems, Optimization and Algorithms.

DESCRIPTIVE NOTE: Final scientific rept. 1 Jul 80-30 Jun  
83.

JUL 84 SP

PERSONAL AUTHORS: Milstein, J. ;

CONTRACT NO. AFOSR-80-0243

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR

TR-84-0743

## UNCLASSIFIED REPORT

ABSTRACT: (U) Research completed includes the following: The dynamics of a system nonlinear ordinary differential equation depends on the constant coefficients (parameters) of the system. Identifying these coefficients from the solution curves defines an inverse problem. A method to determine the values of the parameters from a finite number of solution curves was developed and implemented. The method consist of two major algorithmic procedures (1) A derivative free nonlinear optimization, (2) An error analysis of the parameters found.

DESCRIPTORS: (U) Nonlinear differential equations, Coefficients, Error analysis, Optimization

IDENTIFIERS: (U) Inverse problem, PEB1102F

## SEARCH CONTROL NO. EVI19B

AD-A145 398 8/20 6/5

OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS

(U) Benzamide Derivatives as Protective Agents against the Action of Xenotoxic Agents on Human Cells.

DESCRIPTIVE NOTE: Annual rept. 1 Jan-31 Dec 83.

MAY 84 84P

PERSONAL AUTHORS: Millo, G. E. ;

CONTRACT NO. AFOSR-83-0042

PROJECT NO. 2312

TASK NO. A5

MONITOR: AFOSR

TR-84-0758

## UNCLASSIFIED REPORT

ABSTRACT: (U) In addition to finding that benzamide can interfere in carcinogen induced neoplastic transformation that is cell cycle dependent, we also developed a procedure for detecting the presence of a malignant phenotype in sarcoma tumor tissue. Monoclonal antibodies (McAb) were developed against the transformed phenotype that cross reacted with the chemically transformed cells. We were able also to use this McAb for the detection of sarcomatous invasive lesions in human tissue in the presence of normal stroma. Using these procedures described above combined with the analysis of competitive inhibitory kinetics of poly(ADP-ribose) polymerase activity we have now been able to identify eleven of these inhibitors that interfere in the neoplastic transformation process. (to be published in 1984-85). During this time period we were also able to establish human skin xenografts on nude mice and apply these technologies to human skin in vivo situations. We have also introduced a new technology for examining modification of DNA by the carcinogen, i.e. post labelling of the modified DNA that only requires 2 x 10 to the 8th power cells and ca. 190-200 ng of DNA.

DESCRIPTORS: (U) Neoplasms, Carcinogens, Inhibition, Transformations, Interactions, Deoxyribonucleic acids, Tissue culture, Fibroblasts, Detection, Humans, Skin (Anatomy)

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SEARCH CONTROL NO. EVI19B

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IDENTIFIERS: (U) \*Benzanilide, \*Xenotoxic agents, Phenotype, Xerographs, LPN-OSURF-763409/715087, MUAOSR2312A5, PEO1102F

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SANDIA NATIONAL LABS ALBUQUERQUE NM

(U) IEEE Pulsed Power Conference (4th) Held at Albuquerque, New Mexico on 6-8 June 1983.

DESCRIPTIVE NOTE: Final rept.,

JUN 83 858P

PERSONAL AUTHORS: Rose, M. F.; Martin, T. H.;

CONTRACT NO. AFOSR-ISSA-83-00048

PROJECT NO. 2301

TASK NO. A7

MONITOR: AFOSR  
TR-84-0892

UNCLASSIFIED REPORT

ABSTRACT: (U) Continuing its expansive growth, nearly 600 participants attended the 5th IEEE Pulsed Power Conference with 38 individuals from nine foreign countries - Canada, England, France, Israel, Japan, West Germany, Italy, Switzerland, and Denmark. The number of technical contributions was 220 resulting, for the first time, in a conference with four parallel sessions. In addition to the many fine comments on the technical content of the meeting, we received ample praise for the accommodations, special events and general excellence of the facilities at the Albuquerque Convention Center. It is with reluctance that we leave these facilities for the 1983 conference. The Executive Committee voted to hold the 5th IEEE Pulsed Power Conference in the Washington, D.C. area on June 10, 11, and 12, 1985. Frank Rose of the Naval Surface Weapons Center was elected as Conference Chairman with Peter Turchi, R and D Associates, as the Technical Program Committee Chairman.

DESCRIPTORS: (U) \*Pulse generators, \*Energy conversion, \*Power supplies, \*Switching circuits, Pulse rate, Breakdown(Electronic threshold), Plasmas(Physics), Electric fuzes(Ordnance), Thyatrons, Power, Spark gaps, Vacuum apparatus, Modulators, Dielectrics, Triodes, Explosives, Gases, Diodes, Pulses, New Mexico

IDENTIFIERS: (U) Capacitor banks, Homopolar generators,

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Magnetic switches, Stores(Inductive), Rotating machines,  
Energy storage. WUAFOSR2301A7, PEB1102F

**DTIC REPORT BIBLIOGRAPHY**      **SEARCH CONTROL NO.** EV119B

**AD-A145 239**      **12/1**

**WISCONSIN UNIV-MADISON DEPT OF COMPUTER SCIENCES**

(U) Annual Report, Air Force Grant AFOSR-82-0275.

**DESCRIPTIVE NOTE:** Interim rept. 15 Jun 83-14 Jun 84.

JUL 84      5P

**PERSONAL AUTHORS:** Parter, S. V. ;

**CONTRACT NO.** AFOSR-82-0275

**PROJECT NO.** 2304

**TASK NO.** A3

**MONITOR:** AFOSR  
TR-84-0723

**UNCLASSIFIED REPORT**

**ABSTRACT:** (U) The research project emphasized solving Elliptic-Parabolic Problems. Topics of special interest were: The extension of the basic theory of classical iterative methods; and The study of multigrid methods. This report summarizes progress in these areas to date. (Author)

**DESCRIPTORS:** (U) \*Iterations, \*Grids, Problem solving, Air Force research, Ellipses, parabolas

**IDENTIFIERS:** (U) \*Multigrids, PEB1102F, WUAFOSR2304A3

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NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS  
(U) Comment.

JUN 84      4P

PERSONAL AUTHORS: Carroll, R. J. ;Ruppert, D. ;  
CONTRACT NO. F49602-82-C-0008, NSF-MCS81-00748  
PROJECT NO. 2304  
TASK NO. A5  
MONITOR: AFOSR TR-84-0730

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. In Jnl. of the American Statistical Association, v79 n388 p312-313 Jun 84.  
Reprint: Comment.

DESCRIPTORS: (U) \*Transformations(Mathematics), \*Statistical inference, Models, Data processing, Reprints  
IDENTIFIERS: (U) Power transformation, PEB1102F, WUAFOSR2304AS

MASSACHUSETTS INST OF TECH CAMBRIDGE COMPUTATIONAL FLUID DYNAMICS LAB  
(U) Computational Methods for Complex Flowfields.  
DESCRIPTIVE NOTE: Annual rept. 1 Jun 83-31 May 84.  
JUN 84      87P

PERSONAL AUTHORS: Murman, E. M. ;Baron, J. R. ;  
CONTRACT NO. AFOSR-82-0136  
PROJECT NO. 2307  
TASK NO. A1  
MONITOR: AFOSR TR-84-0755

UNCLASSIFIED REPORT

ABSTRACT: (U) The development of solution algorithms for complex flowfields is the continuing objective of the research. Major focus is on use of coupled subdomains and descriptions which are either preselected or adapted to fit the physical events when necessary. The non-adaptive embedded mesh algorithm has completed airfoil solutions with an allowance for highly stretched meshes, alternate grids and reducing smoothing. A new algorithm is combining features from cell and nodal-centered methods to permit general embedded topology. Adaptive embedded mesh procedures have been extended to and carried out for two-dimensional Euler, subsonic, transonic and supersonic flows. An optimal distribution of local Courant numbers has been considered as a basis for accelerating the solution approach to a steady state. (Author)

DESCRIPTORS: (U) \*Numerical methods and procedures, \*Algorithms, \*Flow fields, \*Computations, Airfoils, Subsonic characteristics, Transonic characteristics, Supersonic characteristics, Grids(Coordinates), Embedding, Adaptive systems, Fluid dynamics

IDENTIFIERS: (U) Euler equations, WUAFOSR2307A1, PEB1102F

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## DTIC REPORT BIBLIOGRAPHY

AD-A148 213 12/1 13/8 15/5

PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF  
INDUSTRIAL AND MANAGEMENT SYSTEMS ENGINEERING

(U) Development of a Production Order Release Methodology.

DESCRIPTIVE NOTE: Final rept. 1 Sep 83-31 May 84.

JUL 84 34P

PERSONAL AUTHORS: Medeiros, D. J. ;

CONTRACT NO. AFOSR-83-0333

PROJECT NO. 2304

TASK NO. D9

MONITOR: AFOSR

TR-84-0726

## SEARCH CONTROL NO. EVI19B

AD-A148 211 5/10 5/9

OKLAHOMA UNIV NORMAN SCHOOL OF INDUSTRIAL ENGINEERING

(U) Workload Demand and CNS Depressant Stressor Effects  
on Spatial Orientation Information Processing.DESCRIPTIVE NOTE: Final scientific rept. 1 Apr 83-31 Mar  
84.

JUL 84 77P

PERSONAL AUTHORS: Schlegel, R. E. ;

CONTRACT NO. AFOSR-83-0181

PROJECT NO. 2313

TASK NO. D9

MONITOR: AFOSR  
TR-84-0759

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) The order release problem involves selecting subsets of available orders to release to the shop floor such that the system is utilized efficiently and queue time is reduced. A solution to this problem is proposed which combines Leontief flow models and linear programming in an iterative procedure. Examples of the approach are illustrated. (Author)

**DESCRIPTORS:** (U) \*Mathematical models, \*Management planning and control, \*Production models, \*Inventory control, Problem solving, Linear programming, Aircraft industry, Iterations, Routing, Efficiency, Assembly, Shops (Work areas), Queueing theory, Methodology

**IDENTIFIERS:** (U) Leontief flow models, Flow models, WJAFOSR2304D9, PEG1102F

**SUPPLEMENTARY NOTE:** Prepared in cooperation with Southeastern Center for Electrical Engineering Education, St. Cloud, FL. Contract F49620-82-C-0035.

**ABSTRACT:** (U) An important element of piloting high-performance jet aircraft is the human ability to perform spatial orientation information processing, particularly when it involves the use of video display instrumentation. Spatial disorientation has consistently been the cause of numerous accidents throughout the history of flight. A study was conducted to further evaluate the Manikin Task, a complex reaction time task previously developed by the RAF as a test of spatial orientation. The objectives of the study were to (1) thoroughly evaluate the training characteristics of the task including variation in performance related to individual stimuli characteristics, (2) determine the task's speed vs. accuracy tradeoff characteristics, and (3) assess performance on the task under the influence of ethanol. Response times and accuracy were measured on five subjects under various conditions over a five-week period. Analysis of the data indicated a substantial dependence of response times on certain stimuli characteristics. In addition, there was a definite decline in accuracy corresponding to a forced decrease in response time. However, the relationship could not be adequately represented by the proposed speed-

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accuracy tradeoff functions. The effect of alcohol was evidenced primarily by a change in the slope if the speed-accuracy tradeoff relationship.

**DESCRIPTORS:** (U) \*Information processing, \*Reaction time, \*Flight training, \*Performance(Human), Accuracy, Measurement, Stimuli, Alcohol consumption, Work load, Air Force training

**IDENTIFIERS:** (U) Spatial orientation, WUAFOSR2313D9, PEG1102F

**SEARCH CONTROL NO.** EVI19B

**AD-A145 205**

**12/1**

**FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS**

(U) Total Positivity. A Review.

**DESCRIPTIVE NOTE:** Technical rept.,

JUN 84

20P

**PERSONAL AUTHORS:** KIM, J. S.; Proschan, F. ;

**REPORT NO.** FSU-STATISTICS-M883, TR-83-159-AFOSR

**CONTRACT NO.** F49620-82-K-0007

**PROJECT NO.** 2304

**TASK NO.** A5

**MONITOR:** AFOSR  
TR-84-0717

**UNCLASSIFIED REPORT**

**SUPPLEMENTARY NOTE:** Supersedes AD-A133 691.

**ABSTRACT:** (U) The main objective of this paper is to review the concepts of total positivity, which plays an important role in various domains of mathematics and statistics. This article describes the power and scope of total positivity, and samples the great variety of fields of its applications. (Author)

**DESCRIPTORS:** (U) \*Functions(Mathematics), \*Statistical processes, Probability density functions, Set theory, Inventory, Statistical decision theory, Multivariate analysis, Reliability, Life tests

**IDENTIFIERS:** (U) Total positivity theory, WUAFOSR2304A5, PEG1102F

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## DTIC REPORT BIBLIOGRAPHY

AD-A145 188 7/3 6/1

WASHINGTON STATE UNIV PULLMAN DEPT OF CIVIL AND ENVIRONMENTAL ENGINEERING

(U) Effect of Toluene on the Solubility of Biohazardous Volatile Synthetic Organic Compounds.

DESCRIPTIVE NOTE: Final rept. 1 Jun 83-31 May 84.

JUL 84 38P

PERSONAL AUTHORS: Hindin, E. ;

CONTRACT NO. AFOSR-83-0175

PROJECT NO. 2303

TASK NO. D9

MONITOR: AFOSR TR-84-0780

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) The solubility of toluene, benzene, 1,1,2-trichloroethylene and p-cresol singly in high purity water at 20 degrees C was determined under dynamic and static conditions. Toluene present in an aqueous solutions enhanced the benzene solubility, decreased the time for solubility to be attained and increased the rate at which solubility was attained. Toluene present in the water caused little difference in the time for 1,1,2-trichloroethylene to reach solubility equilibrium, but caused a more rapid rate in attaining solubility equilibrium and increased the solubility equilibrium concentration. The effect of toluene on the solubility kinetics of p-cresol was to reduce the time in attaining solubility equilibrium, increase the rate in achieving solubility equilibrium and caused little change in the solubility concentration. (Author)

**DESCRIPTORS:** (U) \*Toluenes, \*Solubility, \*Toxic agents, Volatility, Solutions(Mixtures), Water, Benzene, Kinetics, Trichloroethylene, Paint removers

**IDENTIFIERS:** (U) Degreasers, PEG1102F

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## SEARCH CONTROL NO. EVI19B

AD-A145 149 20/4 12/1

NOTRE DAME UNIV IN AERODYNAMICS LAB

(U) Aerodynamics of Airfoils Subject to Three-Dimensional Periodic Gusts.

DESCRIPTIVE NOTE: Final rept..

AUG 83 55P

PERSONAL AUTHORS: Atassi, H. ;

REPORT NO. 1983-12

CONTRACT NO. AFOSR-82-0289

PROJECT NO. 2307

TASK NO. A4

MONITOR: AFOSR TR-84-0787

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) A general analysis of periodic three-dimensional vortical disturbances of streaming motions around streamlined and bluff bodies is developed using a unified approach wherein the mathematical problem is reduced to solving a single inhomogeneous wave equation with non-constant coefficients. In the limit of vanishing Mach number, the problem is formulated in terms of an inhomogeneous Fredholm integral equation of the second kind. The analysis is first applied to study the unsteady aerodynamics of an airfoil of arbitrary shape moving at low Mach number in a three-dimensional periodic gust pattern. Because the homogeneous equation has a non-trivial solution, a special procedure was developed for its solution and uniqueness is obtained by applying the Kutta condition at the trailing edge. Results were compared with those obtained from a nonlinear two-dimensional gust theory and linear oblique gust analyses. Comparison shows a very strong influence of the airfoil geometry and mean flow angle of attack and of the gust parameters on the unsteady lift and moment coefficients. In fact, depending on the conditions considered, the unsteady lift and moment coefficients can be several times larger or smaller than those obtained from linear theories. A superposition principle was derived whereby the unsteady lift and moment acting on a thin airfoil

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI19B

With small camber and small angle of attack and subject to a two-dimensional gust can be constructed by linear superposition to the Sears lift and moment of three independent components accounting separately for the effects of airfoil thickness, airfoil camber and non-zero angle of attack of the mean flow.

**DESCRIPTORS:** (U) \*Unsteady flow, \*Gusts, \*Airfoils, Mathematical models, Periodic variations, Blunt bodies, Streamline shape, Three dimensional flow, Integral equations, Angle of attack, Lift, Thinness, Two dimensional flow, Camber, Blade airfoils, Gust loads, Mathematical prediction, Vortices, Heterogeneity, Aerodynamics, Coefficients, Moments, Trailing edges, Mean, Potential flow, Transfer functions, Stagnation point

**IDENTIFIERS:** (U) Unsteady aerodynamics, Lifting airfoils, Freeform integral equations, Sears lift, PEB1102F, MUAFOFSR2307A4

with small camber and small angle of attack and subject to a two-dimensional gust can be constructed by linear superposition to the Sears lift and moment of three independent components accounting separately for the effects of airfoil thickness, airfoil camber and non-zero angle of attack of the mean flow.

(U) Almost Finite Expansions of Arbitrary Semigroups.

84 53P

PERSONAL AUTHORS: Birget, J. C.; Rhodes, J. ;

CONTRACT NO. AFOSR-81-0238, DAAG29-81-K-0136

PROJECT NO. 2304

TASK NO. A8

MONITOR: AFOSR, ARO  
TR-84-0721, 18343-39-MA

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. In Jnl. of Pure and Applied Algebra, v32 p239-287 1984.

Reprint: Almost Finite Expansions of Arbitrary Semigroups.

**DESCRIPTORS:** (U) \*Groups (Mathematics), \*Algebra, Numerical methods and procedures, Expansion, Global, Coordinates, Reprints

**IDENTIFIERS:** (U) \*Semigroup theory, PEB1102F, MUAFOFSR2304A8

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## UNCLASSIFIED

	DTIC REPORT BIBLIOGRAPHY			SEARCH CONTROL NO.	EVI19B
AD-A145 141	11/8	11/2	20/3	AD-A145 131	9/2
PARIS-6 UNIV (FRANCE)				GEORGE WASHINGTON UNIV	WASHINGTON D C DEPT OF OPERATIONS
(U) Relationships between Electronic Structure and Stability of Metallic Glasses.				(U) Assessing the Reliability of Computer Software and Computing Networks: An Opportunity for Partnership with Computer Scientists.	
DESCRIPTIVE NOTE: Final scientific rept. 30 Sep 78-31 Dec 82.				DESCRIPTIVE NOTE: Technical rept..	
MAY 84	45P			JUL 84	11P
PERSONAL AUTHORS: Abelles, F. ;Theye, M. L. ;Van, V. N. ;				PERSONAL AUTHORS: Barlow, R. E. ;Singpurwalla, N. D. ;	
CONTRACT NO. AFOSR-78-3701				REPORT NO. ORC-84-7	
PROJECT NO. 2308				CONTRACT NO. N00014-77-C-0283, AFOSR-81-0122	
TASK NO. C3				PROJECT NO. 2304	
MONITOR: AFOSR TR-84-0708				TASK NO. A5	
UNCLASSIFIED REPORT			MONITOR: AFOSR TR-84-0821		
ABSTRACT: (U) Amorphous Au-Ge and Ag-Ge alloy films were prepared by co-evaporation on low-temperature (15-20K) substrates under ultra-high vacuum for Ge concentrations between 20 and 40 at.%. Changes in short-range order have been observed by room-temperature electron diffraction experiments for Ge concentrations larger than 30 at.%. The d.c. electrical resistivity and the optical properties of the as-deposited amorphous metallic alloys are examined in detail as a function of composition. The Drude model with a constant relaxation time is found to reproduce the low-energy optical data satisfactorily.	UNCLASSIFIED REPORT			SUPPLEMENTARY NOTE: Prepared in cooperation with the George Washington Univ.	
DESCRIPTORS: (U) *Alloys, *Amorphous materials, *Glass, Electrical resistance, Optical properties, Relaxation time, Optical data, Electron diffraction, Ultrahigh vacuum, Atomic structure, Germanium, Films, Gold, Silver	(U) This paper highlights three areas which are of importance in computer science, and in which statisticians can make valuable contributions. The authors outline these areas, survey the developments, and point out some of the open problems. The research areas are: software reliability, the reliability of fault tolerant computers, and the reliability of computer networks.			DESCRIPTORS: (U) *Computer program reliability, *Fault tolerant computing, *Networks, Computations, Computers, Interfaces, Statistics, Personnel, Mathematical models, Probability, Statistical inference	
IDENTIFIERS: (U) *Metallic glasses, Electronic structure, PEB1102F, MUAFOSR2308C3	(U) Statisticians, PEB1102F, WUNR042372, MUAFOSR2304A5			IDENTIFIERS: (U) Statisticians, PEB1102F, WUNR042372, MUAFOSR2304A5	

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## UNCLASSIFIED

## DTIC REPORT BIBLIOGRAPHY

AD-A145 109 20/5

CALIFORNIA UNIV SANTA BARBARA DEPT OF PHYSICS

(U) Free Electron Lasers.

DESCRIPTIVE NOTE: Final technical rept. 1 Jan-1 Dec 83.

DEC 83 11P

PERSONAL AUTHORS: Colson, W. B. ;

CONTRACT NO. F49620-83-C-0043

PROJECT NO. 2301

TASK NO. A1

MONITOR: AFOSR TR-84-0737

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) Further support of the LANL experiment and the strong-field synchrotron instability has used the LANL periodic window for optical mode analysis. Using the LANL parameters current and magnetic field strength, the effect of the resonator or mode stability was examined. It was found that as much as 20% loss/pass was necessary for the FEL to run without sidebands. When the losses were dropped to 14% pass, a single sideband appeared in the un tapered FEL planned at LANL. When the losses were lowered to 1% (as eventually planned), the optical field vacans chaotic and the FEL went broad band. (Author)

**DESCRIPTORS:** (U) \*Lasers, \*Free electrons, Equations, Electron beams, Broadband, Sidebands, Magnetic fields, Field intensity, Windows, Bibliographies, Reports

**IDENTIFIERS:** (U) MUAFOSR2301A1

**IDENTIFIERS:** (U) Octofluoroclooctatetraene anions, WUAFFRSR2303B2, PE81102F

**IDENTIFIERS:** (U) Octofluoroclooctatetraene anions, WUAFFRSR2303B2, PE81102F

## SEARCH CONTROL NO. EVI198

AD-A145 100 7/3

DARTMOUTH COLL HANOVER NH DEPT OF CHEMISTRY

(U) The Octofluoroclooctatetraene Radical Anion. Identification and Proof of Aromaticity by Electron Spin Resonance.

84 SP

PERSONAL AUTHORS: Walther, B. W. ; Williams, F. ; Lemal, D. M.

CONTRACT NO. AFOSR-83-0047

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR TR-84-0762

## UNCLASSIFIED REPORT

**SUPPLEMENTARY NOTE:** Pub. in Jnl. of the American Chemical Society, v108 n3 p548-551 1984.

**Reprint:** The Octofluoroclooctatetraene Radical Anion. Identification and Proof of Aromaticity by Electron Spin Resonance.

**DESCRIPTORS:** (U) \*Aromatic compounds, Anions, Electron spin resonance, Irradiation, Synthesis (Chemistry), Reprints

**IDENTIFIERS:** (U) Octofluoroclooctatetraene anions, WUAFFRSR2303B2, PE81102F

## UNCLASSIFIED

## DTIC REPORT BIBLIOGRAPHY

AD-A145 099      7/3

DARTMOUTH COLL HANOVER NH DEPT OF CHEMISTRY

(U) Perfluorotropilidene Valence Isomers and the  
Perfluorotropylium Ion.

84      3P

PERSONAL AUTHORS: Dailey, W. P.; Lemai, D. M. ;

CONTRACT NO. AFOSR-83-0047. NSF-CHE79-24309

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR TR-84-0764

SUPPLEMENTARY NOTE: Pub. In Jnl. of the American Chemical Society, v108 p1169-1170 1984.

Reprint: Perfluorotropilidene Valence Isomers and the  
Perfluorotropylium Ion.  
DESCRIPTORS: (U) \*Isomers, Valence, Ions, Fluorine  
Compounds, ReprintsIDENTIFIERS: (U) \*Tropilidane/perfluoro-  
\*Perfluorotropilidene, Fluorocarbons, Perfluorotropylium  
Ions, WUAFOSR2303B2, PE81102F

## SEARCH CONTROL NO. EVI19B

AD-A145 090      12/1      9/2

MASSACHUSETTS INST OF TECH CAMBRIDGE STATISTICS CENTER

(U) Numerical Algorithms and Parallel Tasking.

DESCRIPTIVE NOTE: Interim rept. 15 May 83-14 May 84.

JUL 84 SP

PERSONAL AUTHORS: Klemm, V. ;  
CONTRACT NO. AFOSR-82-0210

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR  
TR-84-0744

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. In Jnl. of the American Chemical

Society, v108 p1169-1170 1984.  
Reprint: Perfluorotropilidene Valence Isomers and the  
Perfluorotropylium Ion.DESCRIPTORS: (U) \*Isomers, Valence, Ions, Fluorine  
Compounds, ReprintsIDENTIFIERS: (U) \*Tropilidane/perfluoro-  
\*Perfluorotropilidene, Fluorocarbons, Perfluorotropylium  
Ions, WUAFOSR2303B2, PE81102F

## UNCLASSIFIED REPORT

ABSTRACT: (U) During this research period progress was  
made on the system integration of the software tasker to  
support algorithmic and applications segmentation for  
concurrent computing. This permits an efficient  
distribution of code and data on processing elements. The  
tasker provides primitives to support the segmenting of  
processes, monitors execution on worker processors by the  
manager on each concurrent system, and achieves  
asynchronous communication among worker processors and  
between the manager processor and the workers. (Author)DESCRIPTORS: (U) \*Algorithms, \*Parallel processing,  
\*Integrated systems, Computations, Dual mode,  
Asynchronous systems, Computer communications, Research  
management, Coding, Microprocessors, Signal processing,  
Image processingIDENTIFIERS: (U) MIMD(Multi Instruction Multiple Data)  
PE81102F, WUAFOSR2304A3

## UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY      SEARCH CONTROL NO. EVI19B  
AD-A145 082      12/1  
FLORIDA UNIV      GAINESVILLE CENTER FOR MATHEMATICAL SYSTEM  
THEORY  
(U) Realization of Covariance Sequences,  
      81      13P  
PERSONAL AUTHORS: Kalman, R. E. ;  
CONTRACT NO. AFOSR-76-3034, DAAA29-77-G-0225  
PROJECT NO. 2304  
TASK NO. A8  
MONITOR: AFOSR  
TR-84-0741

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Presented at Toeplitz Memorial  
Conference, 12 May 81, Tel Aviv, Israel.

ABSTRACT: (U) This paper examines the problem of  
positivity in relation to the partial realization of  
scalar power series. An exact criterion of positivity is  
proved for second-order realizations. The general case is  
currently unsolved. Even the special results contained  
here show that the so-called maximum entropy principle  
cannot be applied to the realization problem in the naive  
sense in which it is employed by physicists. It would be  
better to call this principle a prejudice because it  
does not fully utilize the information inherent in the  
data and does not provide a realization with natural  
(minimal) mathematical properties. (Author)

DESCRIPTORS: (U) \*Sequences(Mathematics), \*Covariance,  
Power series, Scalar functions, Entropy, Physicists,  
Coefficients, Polynomials, Parameters

IDENTIFIERS: (U) WUAFOSR2304A8, PEG1102F

## DTIC REPORT BIBLIOGRAPHY      SEARCH CONTROL NO. EVI19B

AD-A145 081      12/1  
FLORIDA STATE UNIV      TALLAHASSEE DEPT OF STATISTICS

(U) An Integral Inequality with Applications to Order  
Statistics.

DESCRIPTIVE NOTE: Technical rept.,

JUN 84 19P

PERSONAL AUTHORS: Boland, P. J. ; Proschan, F. ;  
REPORT NO. FSU-STATISTICS-MB81, TR-83-169-AFOSR  
CONTRACT NO. F49620-82-K-0007  
MONITOR: AFOSR  
TR-84-0713

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with  
University Coll., Dublin. Dept. of Mathematics.

ABSTRACT: (U) Document discusses life distribution  
functions. Applications in reliability theory and order  
statistics are given.

DESCRIPTORS: (U) \*Inequalities, \*Integrals, \*Order  
statistics, Distribution functions, Reliability, Theory,  
Random variables, Transformations(Mathematics),  
Functions(Mathematics)

IDENTIFIERS: (U) \*Life distribution functions,  
WUAFOSR2304A5, PEG1102F

## UNCLASSIFIED

AD-A145 080	12/1	DTIC REPORT BIBLIOGRAPHY	SEARCH CONTROL NO.	EVI19B
FLORIDA STATE UNIV	TALLAHASSEE	DEPT OF STATISTICS	AD-A145 056	7/5
(U) Testing Whether New is Better than Used of a Specified Age, with Randomly Censored Data.				
DESCRIPTIVE NOTE: Technical rept..				
DEC 83	19P	PERSONAL AUTHORS: Hollander, M. ; Park, D. H. ; Proschan, F. ;	PERSONAL AUTHORS: Laganis, E. D. ; Janik, D. S. ; Curphy, T. J. ; Lemal, D. M. ;	
REPORT NO. FSU-STATISTICS-M869, TR-83-164-AFOSR				
CONTRACT NO. F49620-82-K-0007				
PROJECT NO. 2303				
TASK NO. B2				
MONITOR: AFOSR TR-84-0763				
UNCLASSIFIED REPORT				
SUPPLEMENTARY NOTE: Pub. In Jnl. of the American Chemical Society, v105 n25 p7457-7459 1983.				
Reprint: Photochemistry of Perfluoro-3-diazo-2-butanone.				
DESCRIPTORS: (U) *Photochemical reactions. Butanones. Synthesis (Chemistry). Reprints				
IDENTIFIERS: (U) Perfluoro-3-diazo-2-butanone. Oxiranes. PE81102F, WUAFOSR2303B2				
ABSTRACT: (U) Using randomly censored data, the authors develop a test of the null hypothesis that a new item has stochastically the same residual life length as does a used item of specified age $t_{\text{sub}} 0$ , versus the alternative hypothesis that a new item has stochastically greater residual life length than does a used item of age $t_{\text{sub}} 0$ . They also compare our test with a related test, developed for a complete-data model, in order to study the loss in efficiency because of censoring. (Author)				
DESCRIPTORS: (U) *Statistical tests. *Stochastic processes. *Probability distribution functions. Mathematical models. Survivability. Failure. Hypotheses. Random variables. Cancer. Patients				
IDENTIFIERS: (U) Life distributions. PE81102F				

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## DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI19B

AD-A145 050 13/13 11/2

S-CUBED LA JOLLA CA

(U) Development of Advanced Constitutive Model for Reinforced Concrete.

DESCRIPTIVE NOTE: Final rept. 1 Mar 81-29 Feb 84.

APR 84 177P

PERSONAL AUTHORS: Hegenier, G. A.; Read, H. E.; Murakami, H.

REPORT NO. SSS-R-84-6684

CONTRACT NO. F49620-81-C-0033

PROJECT NO. 2307

TASK NO. C2

MONITOR: AFOSR  
TR-84-0750

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Defense Nuclear Agency, Contract DNA001-84-C-0127.

ABSTRACT: (U) The objective of this research was to develop an advanced, nonlinear, multiaxial constitutive theory for reinforced concrete which provides a modeling capability that is superior to existing models, especially in the nonlinear response regime. The problem of constructing such a theory is partitioned into two major tasks, which have been pursued concurrently. One task consists of formulating a procedure (mixture theory) for analytically mixing reinforcing steel and plain concrete, so that the interaction between the two, which plays a key role in the overall behavior of reinforced concrete, is properly modeled. The other task consists of developing a model of plain concrete, which accurately portrays its nonlinear, multiaxial behavior and which is computationally feasible for use in conjunction with the mixture theory. The mixture theory is designed to synthesize the global constitutive properties of reinforced concrete from the properties of plain concrete, steel, interfaces and reinforcing geometry. The progress made during the course of the program toward achieving the above research objectives is summarized. A detailed

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AD-A145 050 CONTINUED

account of the accomplishments made during the third year of the program are given, since these are not available elsewhere. Finally, a list of the publications and technical interactions which resulted from this research is given.

DESCRIPTORS: (U) \*Reinforced concrete, Structural response, Concrete, Steel, Interactions, Mixtures, Theory, Rock, Soils, Strain(Mechanics), Modification, Stress waves

IDENTIFIERS: (U) \*Strain softening, Constitutive models

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DTIC REPORT BIBLIOGRAPHY		SEARCH CONTROL NO.	EVI19B
AD-A145 045	9/2	12/1	AD-A145 044
STANFORD UNIV	CA DEPT OF CHEMISTRY	FLORIDA UNIV	GAINESVILLE
(U) Set-Theoretic Problems of Null Completion in Relational Databases.		(U) We Can Do Something about Multicollinearity.	
DESCRIPTIVE NOTE:	Technical rept.,	84	14P
		SP	
PERSONAL AUTHORS:	Keller, A. M. ;	PERSONAL AUTHORS:	Kalman, R. E. ;
CONTRACT NO.	AFOSR-80-0212	CONTRACT NO.	AFOSR-81-0238, DAAG29-81-K-0138
PROJECT NO.	2304	PROJECT NO.	2304
TASK NO.	A6	TASK NO.	A6
MONITOR:	AFOSR TR-84-0711	MONITOR:	AFOSR, ARO TR-84-0722, 18343, 33-MA
UNCLASSIFIED REPORT			
SUPPLEMENTARY NOTE: Pub. In Commun. Statist. -Theor. Method., v13 n2 p115-125 1984.			
Reprint: We Can Do Something about Multicollinearity.			
DESCRIPTORS:	(U) *Multicollinearity, *Mathematical models, *Information theory, *Confluence, Econometrics, Macroeconomics, Economic analysis, France, United States, Matrices (Mathematics), Reprints	DESCRIPTORS:	(U) *Data bases, *Set theory, Theorems, Integration, Models, Information systems
IDENTIFIERS:	(U) *Null completion, PEB1102F, WUAFOSR2304A7	IDENTIFIERS:	(U) *Multicollinearity, Frisch scheme, Noisy data, PEB1102F, WUAFOSR2304A8

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SEARCH CONTROL NO. EVI19B

AD-A145 040

20/4

20/13

OKLAHOMA UNIV NORMAN SCHOOL OF AEROSPACE MECHANICAL AND  
NUCLEAR ENGINEERING

(U) Turbulent Boundary Layers Over Rough Surfaces  
Hypersonic Flow.

DESCRIPTIVE NOTE: Final rept. 1 May 83-30 May 84.

JUN 84 43P

PERSONAL AUTHORS: Russell, J. M. ;

CONTRACT NO. AFOSR-83-0186

PROJECT NO. 2307

TASK NO. D8

MONITOR: AFOSR  
TR-84-0756

UNCLASSIFIED REPORT

ABSTRACT: (U) A method for predicting the downstream development of momentum thickness, skin friction, and heat transfer in a supersonic turbulent boundary layer over a rough flat plate based on ideas of Van Driest, Rotta, and Bradshaw is derived and discussed. Admissible thermal boundary conditions include the case of prescribed wall temperature and the case of an adiabatic wall. The velocity profiles for compressible nonadiabatic flow are expressed as transformations of the corresponding velocity profiles in incompressible adiabatic flow. Analytical curve fits to the experimentally determined law-of-the-wall (including the sublayer region) are given, as are analytical representations of the effects of sand grain roughness based on the well known data of Nikuradse. A FORTRAN source code for implementing the method is included as are sample calculations of the momentum thickness, skin friction, and heat transfer for several roughness heights. (Author)

DESCRIPTORS: (U) \*Turbulent boundary layer, \*hypersonic flow, \*surface roughness, Height, Momentum, Thickness, Skin friction, walls, Adiabatic conditions, Aerothermodynamics, FORTRAN, Mathematical prediction, Computer programs, Algorithms, Compressible flow, Transformations (Mathematics), Incompressible flow.

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI19B

AD-A145 040 CONTINUED

Velocity, profiles, Curve fitting, Sand

IDENTIFIERS: (U) Law of the wall, Rotta energy equation,  
Van Driest transformation theory, PEG1102F, WUAR05R230709

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DTIC REPORT BIBLIOGRAPHY

AD-A145 016 9/2

STANFORD UNIV CA DEPT OF COMPUTER SCIENCE

(U) A Reasonable View Update Translator that Preserves No Complement.

DESCRIPTIVE NOTE: Technical rept.,

84 3P

PERSONAL AUTHORS: Keller, A. M. ;

CONTRACT NO. AFOSR-80-0212

PROJECT NO. 2304

TASK NO. A7

MONITOR: AFOSR TR-84-0709

UNCLASSIFIED REPORT

DESCRIPTORS: (U) \*Translators. Data bases. User needs. Access

IDENTIFIERS: (U) Relational data bases. PEB1102F.  
WUAFOSR2304A7

SEARCH CONTROL NO. EVI19B

AD-A145 014 12/1

NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS

(U) Uniform Consistency of a Class of Regression Function Estimators.

84 13P

PERSONAL AUTHORS: Hardle, W. ; Luckhaus, S. ;

CONTRACT NO. F49620-82-C-0009

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-84-0731

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. In the Annals of Statistics, v12 n2 p812-823 1984.

Reprint: Uniform Consistency of a Class of Regression Function Estimators.

DESCRIPTORS: (U) \*Regression analysis, \*Functions (Mathematics), \*Estimates, Nonparametric statistics, Stochastic processes, Consistency, Kernel functions, Bandwidth, Reprints

IDENTIFIERS: (U) PEB1102F

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AD-A145 012      7/3

MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF CHEMISTRY

(U) Hexamethylsilirane. 8. Conversion to 1-Oxa-2-Silacyclopentanes by 'Two-Atom' Insertion Reactions of Aldehydes and Ketones.

84      6P

PERSONAL AUTHORS: Seyforth,D. ;Duncan,D. P. ;Shannon,M. L. ;

CONTRACT NO. AFOSR-83-0003

PROJECT NO. 2303

TASK NO. 82

MONITOR: AFOSR TR-84-0785

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Organometallics, v3 n4 p579-583 1984.

Reprint: Hexamethylsilirane. 8. Conversion to 1-Oxa-2-Silacyclopentanes by 'Two-Atom' Insertion Reactions of Aldehydes and Ketones.

DESCRIPTORS: (U) \*Silicon compounds, Cyclic compounds, Aldehydes, Ketones, Reprints

IDENTIFIERS: (U) \*Siliranes/Hexamethyl, Nucleophilic reactions, Ring openings, PEG102F

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AD-A145 011      7/3

MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF CHEMISTRY

(U) Hexamethylsilirane. IV. Nucleophilic Ring Opening by Alkyllithium Reagents.

84      6P

PERSONAL AUTHORS: Seyforth,D. ;Wiseman,G. H. ;Annarelli,D. C. ;Shannon,M. L. ;

CONTRACT NO. AFOSR-83-0003

PROJECT NO. 2303

TASK NO. 82

MONITOR: AFOSR TR-84-0785

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Organometallic Chemistry, v264 p149-153 1984.

Reprint: Hexamethylsilirane. IV. Nucleophilic Ring Opening by Alkyllithium Reagents.

DESCRIPTORS: (U) \*Grignard reactions, \*Lithium compounds, Reprints, Organometallic compounds

IDENTIFIERS: (U) \*Siliranes/Hexamethyl, Nucleophilic reactions, Ring openings, PEG102F

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AD-A145 009      3/2      20/9

CALIFORNIA UNIV SAN DIEGO LA JOLLA CENTER FOR  
ASTROPHYSICS AND SPACE SCIENCES

(U) Studies of Solar Flares and Coronal Loops.

DESCRIPTIVE NOTE: Final scientific rept. 1 Feb 82-31 May  
84.

JUL 84      241P

PERSONAL AUTHORS: Canfield, R. C. :

REPORT NO. UCSD-SP-84-21

CONTRACT NO. AFOSR-82-0092

PROJECT NO. 2311

TASK NO. A1

MONITOR: AFOSR  
TR-84-0719

UNCLASSIFIED REPORT

ABSTRACT: (U) The objectives of this research were to improve our understanding of solar flares and solar flares and solar coronal loops. The specific approach to the flare objective was to analyze and interpret solar flare data, using theoretical methods developed as part of the research. The specific approach to the coronal loop objective was to investigate their thermal and magnetohydrodynamic stability for various physical models. The principal result of the flare research was to demonstrate that, in two well-observed flares, the mechanism of chromospheric evaporation accounts for the observed amount of flare X-ray plasma. The dominant energy transport mechanism is thermal conduction. Heating by energetic electrons is of secondary importance. The principal results of the magnetohydrodynamic stability analyses were demonstrations of the role of radiative energy loss, compressibility, magnetic field line twist, foot-point magnetic field line tying, and radial plasma pressure gradient.

DESCRIPTORS: (U) \*Chromosphere, \*Solar flares, \*Solar corona, Radiative transfer, Loops, Thermal stability, Magnetohydrodynamics, Stability, Models, Thermal conductivity, Solar x rays, Heating, Evaporation.

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SEARCH CONTROL NO. EVI198

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CONTINUED

Plasmas(Physics), Pressure gradients, Energy transfer,  
Electrons, Magnetic fields, Twisting motion)

IDENTIFIERS: (U) Coronal loops, PE81102F, WUAFOSR2311A1

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DTIC REPORT BIBLIOGRAPHY

AD-A144 998 12/1

CALIFORNIA UNIV BERKELEY OPERATIONS RESEARCH CENTER

(U) Credibility Approximations for Bayesian Prediction of  
Second Moments.

DESCRIPTIVE NOTE: Technical rept..

MAR 84 44P

PERSONAL AUTHORS: Jewell, M. S.; Schnieper, R. ;

REPORT NO. ORC-84-3

CONTRACT NO. AFOSR-B1-0122

PROJECT NO. 2304

TASK NO. AB

MONITOR: AFOSR

TR-84-0820

SEARCH CONTROL NO. EVI19B

AD-A144 996 CONTINUED

statistics for each moment. (Author)

DESCRIPTORS: (U) \*Mathematical prediction, \*Bayes theorem, \*Forecasting, \*Least squares method, Variations, Linear systems, Computations, Approximation(Mathematics), Mathematical models, Formulas(Mathematics), Moments, Matrices(Mathematics), Observations, Estimation, Estimates

IDENTIFIERS: (U) \*Credibility theory, PE61102E

UNCLASSIFIED REPORT

ABSTRACT: (U) Credibility theory refers to the use of linear least-squares theory to approximate the Bayesian forecast of the mean of a future observation; families are known where the credibility formula is exact Bayesian. Second-moment forecasts are also of interest, for example, in assessing the precision of the mean estimate. For some of these same families, the second-moment forecast is exact in linear and quadratic functions of the sample mean. On the other hand, for the normal distribution with normal-gamma prior on the mean and variance, the exact forecast of the variance is a linear function of the sample variance and the squared deviation of the sample mean from the prior mean. Bühlmann has given a credibility approximation to the variance in terms of the sample mean and sample variance. This paper presents a unified approach to estimating both first and second moments of future observations using linear functions of the sample mean and two sample second moments; the resulting least-squares analysis requires the solution of a  $3 \times 3$  linear system, using 11 prior moments from the collective and giving joint predictions of all moments of interest. Previously developed special cases follow immediately. For many analytic models of interest, one can replace the 3-dimensional joint prediction with three independent credibility forecasts using the natural

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI19B

AD-A144 987

12/1

NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF STATISTICS

(U) Power Transformations When Fitting Theoretical Models  
to Data.

JUN 84

9P

PERSONAL AUTHORS: Carroll, R. J.; Ruppert, D. ;

CONTRACT NO. F49620-82-C-0009, NSF-MCS81-00748

PROJECT NO. 2304

PERSONAL AUTHORS: Mifflin, R. ;

CONTRACT NO. AFOSR-83-0210

TASK NO. A5

PROJECT NO. 2304

MONITOR: AFOSR

TR-84-0729

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jml. of the American  
Statistical Association, v79 issue p321-328 Jun 84.

Reprint: Power Transformations When Fitting Theoretical  
Models to Data.

DESCRIPTORS: (U) \*Transformations(Mathematics),  
\*Nonlinear analysis, \*Regression analysis, Mathematical  
models, Asymptotic normality, Monte Carlo method,  
Reprints

IDENTIFIERS: (U) Power transformations, \*Nonlinear  
regression analysis, PEG1102F, WUAFOSR2304AS

IDENTIFIERS: (U) Locally Lipschitz functions, PEG1102F,  
WUAFOSR2304AV

SEARCH CONTROL NO. EVI19B

AD-A144 979

12/1

WASHINGTON STATE UNIV PULLMAN DEPT OF PURE AND APPLIED  
MATHEMATICS

(U) Stationarity and Superlinear Convergence of an  
Algorithm for Univariate Locally Lipschitz Constrained  
Minimization.

84 24P

PERSONAL AUTHORS: Mifflin, R. ;

CONTRACT NO. AFOSR-83-0210

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR  
TR-84-0742

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. In Mathematical Programming, v28  
p50-71 1984.

Reprint: Stationarity and Superlinear Convergence of an  
Algorithm for Univariate Locally Lipschitz Constrained  
Minimization.

DESCRIPTORS: (U) \*Algorithms, \*Functions(Mathematics),  
\*Convergence, Mathematical programming, Optimization,  
Problem solving, Reprints

IDENTIFIERS: (U) Locally Lipschitz functions, PEG1102F,

WUAFOSR2304AV

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI19B

AD-A144 972    6/2    15/2

AD-A144 972    CONTINUED

VANDERBILT UNIV NASHVILLE TN DEPT OF PHARMACOLOGY

(U) Nerve Agent Toxicity and Its Prevention at the Neuromuscular Junction; an Analysis of Acute and Delayed Toxic Effects in Extracellular and Skeletal Muscle.

DESCRIPTIVE NOTE: Final technical rept. 15 Sep 82-31 Mar 84.

MAY 84    17P

PERSONAL AUTHORS: Dettbarn, M. D. ;

CONTRACT NO. AFOSR-82-0310

PROJECT NO. 2312

TASK NO. A3

MONITOR: AFOSR

TR-84-0748

UNCLASSIFIED REPORT

ABSTRACT: (U) The nerve agent soman (0.080 mg/kg s.c.), as well as other organophosphates in concentrations that cause cholinergic symptoms, DFP (1.5 mg/kg s.c.), paraoxon (0.23 mg/kg s.c.), and tertiary (0.2 mg/kg s.c.) and quaternary phospholine (0.080 mg/kg s.c.) induced a progressive, dose-related necrosis in rat skeletal muscle fiber. The severity of the myopathy depended on a critical decrease and duration of AChE inhibition. The fast type I fibers appeared to be the more affected fibers in all muscles tested. The necrotic nerve fibers were repaired within one week. Examination of muscle fibers 2 and 3 weeks after a single injection of soman showed a large number of ragged red fibers in the diaphragm and soleus muscle. Following AChE inhibition, the 4S molecular form of AChE showed the fastest recovery as compared with the 10S, 12S and 16S forms. The half-time recovery rate of AChE after inhibition depended on the inhibitor used and the tissue investigated. In general, half-time rate of recovery was slowest in brain and nerve and fastest in SOL and EDL muscle. AChE activity of peripheral nerve was barely inhibited by soman and had recovered to control activity within 24 hours.

DESCRIPTORS: (U) \*Toxicity, \*Nerve agents, \*GD agent,

AD-A144 972

AD-A144 972

\*Acetylcholinesterase, Inhibition, Neuromuscular transmission, Recovery, Activation, Junctions, Muscles, Muscle fibers, Rats, Cholinesterase Inhibitors

IDENTIFIERS: (U) PEG1102F, WUAFOSR2312A3

+Acetylcholinesterase, Inhibition, Neuromuscular transmission, Recovery, Activation, Junctions, Muscles, Muscle fibers, Rats, Cholinesterase Inhibitors

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## DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI19B

AD-A144 969 12/1 9/3 AD-A144 968 12/1

SCIENTIFIC RESEARCH ASSOCIATES INC GLASTONBURY CT

(U) Solution of the Boltzmann Transport Equations for a  
Permeable Base Transistor.

DESCRIPTIVE NOTE: Final rept. 17 Oct 83-31 May 84.

JUL 84 37P

PERSONAL AUTHORS: Buggeln, R. C.; Krestovsky, J. P.; Grubin,

H. L.;

REPORT NO. SRA-R84-910005-F

PROJECT NO. 2304

CONTRACT NO. F49820-83-C-0157

TASK NO. A6

PROJECT NO. 300S

MONITOR: AFOSR TR-84-0732

TASK NO. A1

MONITOR: AFOSR TR-84-0707

## UNCLASSIFIED REPORT

## UNCLASSIFIED REPORT

ABSTRACT: (U) A description of a numerical method for  
solving the Boltzmann transport equations is presented.  
This numerical technique is applied to the case of the  
solution of the Boltzmann equations for a gallium  
arsenide permeable base transistor. Calculated results  
are presented for two base potentials. (Author)DESCRIPTORS: (U) \*Numerical methods and procedures,  
\*Boltzmann equation, \*Solutions(General), Transistors,  
Permeability, Gallium arsenides, Diffusion, Transport  
properties, Drift, Electrical properties, Charts,  
AlgorithmsIDENTIFIERS: (U) Transport equations, PEG1102F,  
WUAFOSR3005A1(U) Marginal Values and Second-Order Necessary Conditions  
for Optimality.  
PERSONAL AUTHORS: Rockafellar, R. T.;

CONTRACT NO. F49820-82-K-0012

PROJECT NO. 2304

TASK NO. A6

MONITOR: AFOSR TR-84-0732

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Mathematical Programming. v28

p245-286 1983.

Reprint: Marginal Values and Second-Order Necessary  
Conditions for Optimality.DESCRIPTORS: (U) \*Nonlinear programming, Methodology,  
Optimization, Parametric analysis, Value, Lagrangian  
functions, Reprints

IDENTIFIERS: (U) PEG1102F, WUAFOSR2304A6

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DTIC REPORT BIBLIOGRAPHY		SEARCH CONTROL NO.	EVI19B
AD-A144 943	7/3	AD-A144 942	12/1
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF CHEMISTRY		RUTGERS - THE STATE UNIV NEW BRUNSWICK N J DEPT OF MATHEMATICS	
(U) Hexamethylsilirane. 5. Conversion to Five-Membered Ring Silicon Compounds by 'Two-Atom' Insertion Reactions of Aryl Olefins, 1,3-Dienes, and Conjugated Acetylenes,		(U) Exact Results for the Two-Dimensional Two-Component Plasma.	
84	8P	JUN 84	SP
PERSONAL AUTHORS:	Seydel, D. ; Duncan, D. P. ; Shannon, M. L. ; Goldstein, E. W. ;	PERSONAL AUTHORS:	Nicolaidis, D. ;
CONTRACT NO.	AFOSR-83-0003	CONTRACT NO.	AFOSR-82-0016
PROJECT NO.	2303	PROJECT NO.	2301
TASK NO.	82	TASK NO.	A8
MONITOR:	AFOSR TR-84-0740	MONITOR:	AFOSR TR-84-0740
UNCLASSIFIED REPORT			
SUPPLEMENTARY NOTE: Pub. In Organometallics, v3 n4 p574-578 1984.		SUPPLEMENTARY NOTE: Pub. In Physics Letters, v103A n1,2 p84-86, 18 Jun 84.	
Reprint: Hexamethylsilirane. 5. Conversion to Five-Membered Ring Silicon Compounds by 'Two-Atom' Insertion Reactions of Aryl Olefins, 1,3-Dienes, and Conjugated Acetylenes.		Reprint: Exact Results for the Two-Dimensional Two-Component Plasma.	
DESCRIPTORS: (U) *Silicon compounds, Unsaturated hydrocarbons, Chemical reactions, Reprints		DESCRIPTORS: (U) *Computations, *Plasmas(Physics), Free energy, Correlation techniques, Two dimensional Temperature	
IDENTIFIERS: (U) *Silirane/hexamethyl, *Insertion reactions, Ring compounds, MUAFOSR2303B2, PE81102F		IDENTIFIERS: (U) Reprints, MUAFOSR2301A8, PE81102F	

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AD-A144 941      8/15  
DTIC REPORT BIBLIOGRAPHY      SEARCH CONTROL NO. EVI19B  
LDS ALAMOS NATIONAL LAB NM  
(U) Performance Enhancement.  
DESCRIPTIVE NOTE: Final rept..  
MAR 84      13P  
PERSONAL AUTHORS: George, J. S.; Bitensky, M. W.;  
CONTRACT NO. AFOSR-MIPR-82-00004  
PROJECT NO. 2312  
TASK NO. A1  
MONITOR: AFOSR TR-84-0749

UNCLASSIFIED REPORT

ABSTRACT: (U) Work thus far has focused on a class of tricyclic antidepressants (TADS) whose action has a gradual onset associated with the metabolic response to the drugs. Chronic treatment of rats with TADS sensitized synaptosomal adenylylate cyclase (AC) to activation with guany nucleotides. The research has attempted to describe anatomical and functional localization of the response, probe the biochemical mechanism of observed effects; and look for behavioral correlates of biochemical changes. An interesting finding is that unlike the hypothalamic or cortical enzyme, enzyme, cerebellar synaptosomal AC is not sensitized to nucleotide activation. A number of plausible biochemical mechanisms for the observed TAD responses have been investigated, and several additional possibilities have been identified. The precise mechanisms involved remains unclear. Several behavioral tests were employed to attempt to quantify observed behavioral differences between control and TAD-treated animals. The most significant observed differences was in the range and variance of responses between groups. More sophisticated and sensitive experimental paradigms are being developed.

DESCRIPTORS: (U) \*Drugs, Behavior, Metabolism, Response(Biology), Rats, Activation, Nucleotides, Biochemistry, Hypothalamus

AD-A144 941

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DTIC REPORT BIBLIOGRAPHY      SEARCH CONTROL NO. EV119B  
AD-A144 934      3/2      20/8      14/5      AD-A144 845      12/1  
ROCHESTER UNIV NY  
(U) Laser Speckle and Related Phenomena.  
      84      69P  
PERSONAL AUTHORS: DaInty, J. C. ;  
CONTRACT NO. AFOSR-81-0003  
PROJECT NO. 2311  
TASK NO. A1  
MONITOR: AFOSR  
TR-84-0848

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Topics in Applied Physics, v8  
p255-320 1984.

Reprint: Laser Speckle and Related Phenomena.

DESCRIPTORS: (U) \*Astronomical bodies, \*Interferometry, Signal to noise ratio, Photographic images, Resolution, Diffraction, Mathematical models, Algorithms, Bibliographies, Reprints

IDENTIFIERS: (U) Stellar interferometry, \*Speckle Interferometry, WUAOSR2311A1, PEB1102F

DTIC REPORT BIBLIOGRAPHY      SEARCH CONTROL NO. EV119B

AD-A144 845      12/1

PITTSBURGH UNIV PA CENTER FOR MULTIVARIATE ANALYSIS

(U) Some Weak and Strong Laws of Large Numbers for  $D(0,1)$  - Valued Random Variables.

DESCRIPTIVE NOTE: Technical rept.,

JUL 84 45P

PERSONAL AUTHORS: Wang, X. C.; Rao, M. B. ;

REPORT NO. TR-84-36

CONTRACT NO. F49620-82-K-0001

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR  
TR-84-0714

## UNCLASSIFIED REPORT

ABSTRACT: (U) Pointwise Weak Law of Large Numbers and Weak Law of Large Numbers in the norm topology of  $D(0,1)$  are shown to be equivalent under uniform convex tightness and uniform integrability conditions for weighted sums of a sequence of random elements in  $D(0,1)$ . Uniform convex tightness and uniform integrability conditions are jointly characterized. Marcinkiewicz-Zygmund-Kolmogorov's and Brunk-Chung's Strong Laws of Large Numbers are derived in the setting of  $D(0,1)$  - space under uniform convex tightness and uniform integrability conditions. Equivalence of pointwise convergence, convergence in the Skorokhod topology and convergence in the norm topology for sequences in  $D(0,1)$  is studied. (Author)

DESCRIPTORS: (U) \*Random variables, \*Numbers, \*Convergence, Topology, Banach space, Convex bodies, Tightness, Stochastic processes, Theorems

IDENTIFIERS: (U) WUAOSR2304A5, PEB1102F

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI198

AD-A144 756 12/1 20/8

PITTSBURGH UNIV PA DEPT OF CHEMISTRY

(U) Shift-variant Multidimensional Systems.

DESCRIPTIVE NOTE: Annual rept. 1 Feb 83-31 Jan 84.

MAR 84 80P

PERSONAL AUTHORS: Boss, N. K. ;

CONTRACT NO. AFOSR-83-0038

PROJECT NO. 2304

TASK NO. A8

MONITOR: AFOSR  
TR-84-0889

UNCLASSIFIED REPORT

ABSTRACT: (U) To a great extent the techniques for analysis and restoration of images has been developed under the assumption that the system is linear shift-invariant (LSI). These techniques are successful in some cases because a system which is diffraction-limited or a system whose object plane undergoes uniform linear motion perpendicular to the system reference axis does indeed satisfy these assumptions. However, LSI systems are singled out for study mainly because of the widespread understanding of the Fourier Transform theory along with well-known fast algorithms for its implementation. In comparison with LSI systems, very little work has been done on linear shift-variant (LSV) systems. Most of the research on two dimensional LSV systems has been done on restoration techniques by means of coordinate transformations. This technique decomposes the LSV system into a distortion of the input plane followed by a shift-invariant operation and terminated by a distortion of the output plane. The primary objective of this research is to provide not only a mathematical structure for the state-space modeling of discrete LSV systems but to apply this model to the problems of efficient analysis and deconvolution of multidimensional systems.

DESCRIPTORS: (U) \*Mathematical models, \*Image restoration, Fourier transformation, Theory, Coordinates, Transformations (Mathematics), Two dimensional, Linearity, Degradation, Distortion, Air Force Research AD-A144 756

AD-A144 756

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IDENTIFIERS: (U) Linear shift variant systems, Multidimensional systems, Image understanding, PE81102F,  
WUAFOSR2304A6

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI19B

AD-A144 754

7/5

COLUMBIA UNIV NEW YORK DEPT OF CHEMISTRY

(U) Organic Photochemical Mechanisms.

84

SP

PERSONAL AUTHORS: Turro, N. J. ;

CONTRACT NO. AFOSR-81-0013

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR TR-84-0880

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Photochemistry. v25 n89 p69-72 1984.

Reprint: Organic Photochemical Mechanisms.

DESCRIPTORS: (U) \*Photochemical reactions, \*Organic compounds, \*Reaction kinetics, Instrumentation, Solvents, Homogeneity, History

IDENTIFIERS: (U) PEB1102F, MUAFOSR2303B2

AD-A144 707

7/3

CALIFORNIA UNIV SANTA BARBARA DEPT OF CHEMISTRY

(U) Ligand (Adsorbate) Substitutions at Metal Surfaces: Aromatic Compounds and Halides at Smooth Polycrystalline Platinum Electrodes.

DEC 83

SP

PERSONAL AUTHORS: Soriano, M. P. ; White, J. H. ; Song, D. ; Hubbard, A. T. ;

CONTRACT NO. AFOSR-81-0149

PROJECT NO. 2303

TASK NO. A1

MONITOR: AFOSR TR-84-0684

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Physical Chemistry. v88 n11 p2284-2287, 27 Dec 83.

Reprint: Ligand (Adsorbate) Substitutions at Metal Surfaces: Aromatic Compounds and Halides at Smooth Polycrystalline Platinum Electrodes.

DESCRIPTORS: (U) \*Substitution reactions, \*Surface reactions, \*Platinum, Adsorption, Ligands, Halides, Aromatic compounds, Reprints

IDENTIFIERS: (U) PEB1102F, MUAFOSR2303A1

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## DTIC REPORT BIBLIOGRAPHY

AD-A144 671 12/1

RUTGERS - THE STATE UNIV NEW BRUNSWICK N J DEPT OF  
MATHEMATICS  
(U) Analysis and Regulation of Nonlinear and Generalized  
Linear Systems.

DESCRIPTIVE NOTE: Interim rept. 15 Jun 83-14 Jun 84.

JUL 84 10P

PERSONAL AUTHORS: Sonsteg, E. D. ;

CONTRACT NO. F49620-79-C-0117, AFOSR-80-0198

PROJECT NO. 2304

TASK NO. A8

MONITOR: AFOSR  
TR-84-0894

## UNCLASSIFIED REPORT

ABSTRACT: (U) This work emphasizes research on discrete-time nonlinear system theory as well as algebraic methods in the analysis of generalized classes of linear systems.  
(Author)

DESCRIPTORS: (U) \*Nonlinear systems, \*Linear systems,  
Differential equations, Control, Parameters, Dynamics,  
\*Nonlinear analysis

IDENTIFIERS: (U) Linear analysis, MUAFOSR2304AB,  
PE81102F

## SEARCH CONTROL NO. EVI19B

AD-A144 658 12/1

## PITTSBURGH UNIV PA CENTER FOR MULTIVARIATE ANALYSIS

(U) Tests for Sphericity under Correlated Multivariate  
Regression Equations Model.

DESCRIPTIVE NOTE: Technical rept..

JUL 84 33P

PERSONAL AUTHORS: Sarkar, S. ; Krishnamah, P. R. ;

REPORT NO. TR-84-37

CONTRACT NO. F49620-82-K-0001

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR  
TR-84-0888

## UNCLASSIFIED REPORT

ABSTRACT: (U) In this report, the authors considered some tests for sphericity of the error covariance matrix under a correlated multivariate regression equations model. Asymptotic distributions of the test statistics associated with the above procedures are also derived.  
(Author)

DESCRIPTORS: (U) \*Mathematical models, Spheres,  
Multivariate analysis, Regression analysis

IDENTIFIERS: (U) Sphereity, PE81102F, MUAFOSR2304AB

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AD-A144 658

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## DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI19B

AD-A144 859 20/5 13/8

BATTELLE COLUMBUS LABS OH

(U) Three-Dimensional Photochemical Machining with Lasers.  
DESCRIPTIVE NOTE: Semi-Annual technical rept. no. 2, 1  
Aug 83-31 Jan 84.

PERSONAL AUTHORS: Scherzer, R. E. ;

CONTRACT NO. F48620-82-C-0077, ARPA Order-4522

MONITOR: AFOSR  
TR-84-0588

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Annual technical rept. no. 1,  
AD-A143 928.

ABSTRACT: (U) Research on new photoinitiator systems and improved photopolymers for photochemical machining with lasers has resulted in the successful laboratory demonstration of crossed-beam polymerization, although some single-beam polymerization still occurs under the condition examined to date. Porphyrin sensitizers and acrylate polymers have given the best results so far, especially when the samples are first degassed under vacuum to remove oxygen. A computer-controlled three-axis translation stage has been constructed to move the sample relative to the (fixed) laser beams. Future work will be directed toward continued improvement of the polymer materials. (Author)

DESCRIPTORS: (U) \*Photochemical reactions, \*Machining,  
\*Lasers, Polyacrylates, Laser beams, Three dimensional,  
Polymerizing, Demonstrations, Cross beam devices,  
Sensitizing, Porphyrins

IDENTIFIERS: (U) Photoinitiator systems, PEB1102F

AD-A144 835 7/5

VIRGINIA UNIV CHARLOTTESVILLE DEPT OF CHEMISTRY

(U) Electron-Transfer Quenching of Ruthenium(II)  
Photosensitizers by Mercury(II) in Aqueous Nitrate  
Media.

84 7P

PERSONAL AUTHORS: Hauenstein, B. L. ; Jr.; Dressick, W. J. ;  
Demas, J. N. ; Degraff, B. A. ;

CONTRACT NO. AFOSR-78-3590, NSF-CHE82-06279

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR  
TR-84-0883

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Physical Chemistry.  
v88 n1 p2418-2422 1984.

Reprint: Electron-Transfer Quenching of Ruthenium(II)  
Photosensitizers by Mercury(II) in Aqueous Nitrate Media.

DESCRIPTORS: (U) \*Photosensitivity, \*Electron transfer,  
Quenching, Ruthenium, Mercury, Nitrates, Reprints

IDENTIFIERS: (U) PEB1102F, WUAFOSR2303B2

AD-A144 836

AD-A144 635

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI19B

AD-A144 617 5/10 AD-A144 617 CONTINUED

GEORGIA INST OF TECH ATLANTA SCHOOL OF PSYCHOLOGY

(U) Estimating the Number and Duration of Cognitive Processes Using the Within-Task Subtractive Method.

DESCRIPTIVE NOTE: Final technical rept. 15 Apr 83-14 Apr 84.

JUN 84 63P

PERSONAL AUTHORS: Corso, G. M.; Patterson, M. J. ;

CONTRACT NO. AFOSR-83-0088

PROJECT NO. 2313 \*

TASK NO. D9

MONITOR: AFOSR TR-84-0898

UNCLASSIFIED REPORT

ABSTRACT: (U) This research was directed towards developing a methodology for partitioning choice-reaction time into component parts, using both the additive-factor and the subtractive method. This methodology involved the use of a modified Sternberg task in which the subjects viewed two horizontally presented letters and were required to classify each of the letters into either the positive or negative set. The classification procedure was performed by depressing two response keys on the same trial. Latency measures were obtained for the elapsed time between stimulus onset and the first response and between the first response and the second response. Input and output times were then derived. In addition, three different types of interruption stimuli (auditory, visual and auditory-visual) were presented at various times prior to and after the onset of the classification stimulus. Input and output latencies were differentially influenced by the different types of interruption stimuli and by the onset time of those interruption stimuli.

DESCRIPTORS: (U) \*Interruption, \*Test construction(Psychology), \*Cognition, \*Reaction time, Classification, Stimuli, Time, Parts, Performance(Human), Decision making, Reaction(Psychology), Addition, Factor analysis, Test methods, Classification, Visual signals, Acoustic signals, Delay

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AD-A144 815 12/1 DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVI19B  
 BROWN UNIV PROVIDENCE RI LEFSCHETZ CENTER FOR DYNAMICAL AD-A144 810 8/11 8/6  
 SYSTEMS WEIDLINGER ASSOCIATES MENLO PARK CA  
 (U) Approximation of Feedback Controls for Parabolic (U) Large-Scale Numerical Analysis of Three-Dimensional  
 Systems. Seismic Waves.  
 DESCRIPTIVE NOTE: Final rept. 1 Oct 82-30 Sep 83.  
 83 SP MAY 84 53P  
 PERSONAL AUTHORS: Banks, H. T.; Kunisch, K.;  
 CONTRACT NO. DAAG29-79-C-0161, AFOSR-81-0198 PERSONAL AUTHORS: Wojcik, G. L.; Vaughan, D. K.;  
 REPORT NO. R-8403  
 MONITOR: AFOSR CONTRACT NO. F49620-82-C-0002  
 TR-84-0295 PROJECT NO. 2309  
 UNCLASSIFIED REPORT TASK NO. A1  
 Availability: Pub. in IEEE, p247-251 1983 (No copies MONITOR: AFOSR  
 furnished by DTIC/NTIS). TR-84-0691  
 Reprint: Approximation of Feedback Controls for Parabolic UNCLASSIFIED REPORT  
 Systems.

DESCRIPTORS: (U) \*Riccati equation, Feedback, Control, Computations, Operators(Mathematics), Feedback, Control, Partial Approximation(Mathematics), Hilbert space, Partial differential equations, Reprints

IDENTIFIERS: (U) \*Parabolic systems

ABSTRACT: (U) This report concludes our study of large-scale vectorized numerical analysis applied to time-domain seismic wave phenomena in filled basins. Applications include calculations of waves from simple surface or buried sources in a variety of idealized 2-D Basin and Range models (38,000 to 120,000 nodes) described in an interim report, and one large 3-D model (400,000 nodes) from Yucca Flat, Nevada Test Site, described here. Analysis is based on an explicit, finite element, elastic wave solver designed for vectorized execution on the CRAY-1. The primary result of the present 3-D study is that, given the database available from investigations in Yucca Flat, Nevada Test Site, the size of feasible 3-D computational models on the CRAY-15 is adequate to simulate elastic wave fields and interpret arrivals for comparison with existing 3-D ground motion data. Synthetic seismograms from a 400,000 element 3-D simulation of the COALORA event at Yucca Flat indicate that a significant source of transverse motion on radial lines through the source is diffraction from a discontinuity in the Rainier Mesa tuff layer across the Yucca fault. Successful time-domain simulations in 3-D are feasible with pipelined supercomputers but optimal processing requires careful tailoring of the algorithm to vectorize inner code loops and eliminate nonessential

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DTIC REPORT BIBLIOGRAPHY

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arithmetic.

DESCRIPTORS: (U) \*Seismic waves, \*Basins(Geographic), Mountains, Three dimensional, Mathematical models, Time domain, Finite element analysis, Computerized simulation, Algorithms, Earth crust

IDENTIFIERS: (U) Wave fields, CRAY-1 computers, MUAFOSR2309A1, PE81102F

SEARCH CONTROL NO. EVI19B

AD-A144 609 20/8

ARIZONA UNIV TUCSON ENGINEERING EXPERIMENT STATION

(U) Analytic Solution of the Spencer-Lewis Angular-Spatial Moments Equations.

DESCRIPTIVE NOTE: Final rept. 1 Jun 83-31 May 84.

JUL 84 53P

PERSONAL AUTHORS: Filippone, W. L. ;

CONTRACT NO. AFOSR-83-0174

PROJECT NO. 2301

TASK NO. D9

MONITOR: AFOSR  
TR-84-0897

UNCLASSIFIED REPORT

ABSTRACT: (U) An exact solution for the angular-spatial moments of the Spencer-Lewis equation is given, along with methods for reconstructing the electron density function. The new solution technique is implemented in a computer code and several sample calculations are carried out with monoenergetic plane sources of electrons in infinite media of aluminum and carbon. The sample calculations produce the electron distribution in space and path length rather than some integrated quantity such as the energy deposition profile. Such analytic solutions are intended to serve as benchmarks for testing numerical electron transport codes. (Author)

DESCRIPTORS: (U) \*Moments, \*Electron transport, Mathematical analysis, Electron density, Normal density functions, Numerical methods and procedures, Computer programs, Electrons, Distribution, Aluminum, Media, Paths, Length

IDENTIFIERS: (U) \*Angular spatial moments, \*Spencer Lewis equation, MUAFOSR2309A1, PE81102F

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI19B

AD-A144 800

9/2

VIRGINIA UNIV CHARLOTTESVILLE DEPT OF CHEMISTRY

(U) An Axes-Drawing Program for the Hewlett Packard Digital Plotters.

JUL 83

2P

PERSONAL AUTHORS: Pearson, T. D. L. ; Demas, J. N. ;

Jr. ;

CONTRACT NO. AFOSR-78-3590

CONTRACT NO. AFOSR-82-0133

PROJECT NO. 2303

PROJECT NO. 2303

TASK NO. B2

TASK NO. A2

MONITOR: AFOSR

MONITOR: AFOSR

TR-84-0880

TR-84-0874

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. In Jnl. of Chemical Education, v60 n7 p568-569 Jul 83.

Reprint: An Axes-Drawing Program for the Hewlett Packard Digital Plotters.

DESCRIPTORS: (U) \*Computer programming, \*Plotters, \*Computers, Symbolic programming, High level languages, Axes, Labels, Reprints

IDENTIFIERS: (U) Hewlett Packard Digital Plotter, AXES program, PE81102F, MUAFOSR2303A2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. In Chemical Physics Letters, v106 n5 p477-481, 4 May 84.

Reprint: Evidence for Chemisorption Site Selection Based on an Electron-Donor Mechanism.

DESCRIPTORS: (U) \*Chemisorption, \*Site selection, \*Electron donors, Nickel, Clustering, Theory, Reprints

IDENTIFIERS: (U) PE81102F, MUAFOSR2303A2

PITTSBURGH UNIV PA DEPT OF CHEMISTRY

(U) Evidence for Chemisorption Site Selection Based on an Electron-Donor Mechanism.

MAY 84

7P

PERSONAL AUTHORS: Klauber, C. ; Alvey, M. D. ; Yates, J. T. ;

Jr. ;

PROJECT NO. 2303

PROJECT NO. 2303

TASK NO. A2

MONITOR: AFOSR

TR-84-0874

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. In Chemical Physics Letters, v106 n5 p477-481, 4 May 84.

Reprint: Evidence for Chemisorption Site Selection Based on an Electron-Donor Mechanism.

DESCRIPTORS: (U) \*Chemisorption, \*Site selection, \*Electron donors, Nickel, Clustering, Theory, Reprints

IDENTIFIERS: (U) PE81102F, MUAFOSR2303A2

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AD-A144 593	9/4	17/5	17/8	17/2	AD-A144 593 CONTINUED
<b>HONEYWELL SYSTEMS AND RESEARCH CENTER MINNEAPOLIS MN</b>					
(U) Hierarchical Multisensor Image Understanding.				IDENTIFIERS: (U) *Image understanding, Scene analysis, Attributed graphs, MUAF0SR230A7, PE81102F	
DESCRIPTIVE NOTE: Annual rept. Oct 83-Sep 84, Interim rept. 1 Jul 83-30 Jun 84,				IAC NO.	GC-840821
JUL 84	6SP	PERSONAL AUTHORS:	Aggarwal, R. K. ;	IAC DOCUMENT TYPE:	GACIAC - MICROFICHE --
CONTRACT NO.	F49620-83-C-0134	PROJECT NO.	2304	IAC SUBJECT TERMS:	G--(U)Image processing, Multiple sensors, Multiple correlation, Scene analysis, Segmentation, Target detection, Target identification, Artificial intelligence, Pattern recognition, Millimeter waves, Infrared sensors, Infrared spectra, Visible spectrum, Edge extraction, Target recognition.;
TASK NO.	A7	MONITOR:	AFOSR TR-84-0839		

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Original contains color plates: All DTIC and NTIS reproductions will be in black and white.

ABSTRACT: (U) This report describes the research results on Honeywell's Hierarchical Multisensor Image Understanding program. Honeywell is developing a unified framework for the different hierarchical levels of image processing such as segmentation, detection, classification, and identification of outdoor scenes and across different sensor modalities such as millimeter wave, infrared, and visible. Current activities on the project are reviewed under the following headings: (1) artificial-intelligence-based generic image segmentation and object recognition; (2) evidence-confidence paradigms for image understanding; (3) hierarchical systems theory for control structures; and (4) invariant methods in image understanding. Also discussed are scene analysis and attributed graphs.

DESCRIPTORS: (U) \*Image processing, \*Pattern recognition, \*Target recognition, Control, Graphs, Theory, Millimeter waves, Segmented, Detection, Images, Multisensors, Identification, Outdoor Recognition, Hierarchies, Classification, Artificial intelligence, Infrared spectra, Visible spectra, Control systems, Confidence level, Information theory

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## DTIC REPORT BIBLIOGRAPHY

AD-A144 557      5/13      9/2      SEARCH CONTROL NO. EVI19B  
 AD-A144 535      5/9      5/10      6/2      12/1  
 9/2

WASHINGTON UNIV ST LOUIS MO BEHAVIOR RESEARCH LAB

(U) A Psychophysiological Mapping of Cognitive Processes.

DESCRIPTIVE NOTE: Progress rept., 1 Mar 83-29 Feb 84,  
 MAY 84 10P

PERSONAL AUTHORS: Stern, J. A. ; Goldstein, R. ;

REPORT NO. 0059-84-1

CONTRACT NO. F49620-83-C-0059

PROJECT NO. 2313

TASK NO. A4

MONITOR: AFOSR

TR-84-0701

## UNCLASSIFIED REPORT

PERCEPTRONICS INC WOODLAND HILLS CA  
 (U) Operator Alertness/Work Load Assessment Using Stochastic Model-Based Analysis of Myoelectric Signals.

DESCRIPTIVE NOTE: Interim rept., 1 Oct 82-31 Mar 84.

APR 84 87P

PERSONAL AUTHORS: Madni, A. M. ; Scopp, R. I. ; Chu, Y. Y. ;  
 Purcell, D. D. ;

REPORT NO. PPR-112B-84-4

CONTRACT NO. F49620-83-C-0001

PROJECT NO. 2313

TASK NO. A4

MONITOR: AFOSR

TR-84-0703

## UNCLASSIFIED REPORT

ABSTRACT: (U) This technical report consists of a

Behavior Research Laboratories supported by the AFOSR. The text describes the hardware assembled for the proposed studies and the software which has been developed for stimulus presentation and execution. The study format is described as well as some preliminary results bearing on the issues to be addressed. (Author)

DESCRIPTORS: (U) \*Psychophysiology, \*Computerized simulation, Computer programming, Data acquisition, Data reduction, Stimulation(physiology), Stimuli, Eye movements, Behavioral Science

IDENTIFIERS: (U) PEB1102F, WUAFOSR2313A4

## UNCLASSIFIED REPORT

ABSTRACT: (U) This interim report documents the work done to this point on Autoregressive Integrated Moving-Average (ARIMA) model-based analysis of myoelectric signals. The ARIMA modelling procedure and the hardware required for collecting myoelectric data are described in detail. Pattern analysis methods for characterizing the myoelectric signals under different levels of alertness/work load are discussed. Additionally, the various tasks in the Experimental Control Package that subjects must perform while being monitored are described. Finally, an analysis of data obtained during experimental sessions is provided giving some indication of discriminability of the ARIMA signatures over different task difficulty levels and subjects. Results of this analysis indicate that the first AR parameter is the most useful feature in differentiating work load/alertness level. Additionally, this feature was shown to be reliable for each underlying level of alertness or load in a given task.

DESCRIPTORS: (U) \*Operators(Personnel), \*Performance(Human), \*Pilots, \*Work load, \*Electromyography, \*Monitoring, \*Mathematical models, Muscles, Vigilance, Attention, Stochastic processes,

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AD-A144 535      CONTINUED  
  
Regression analysis, Signal processing, Pattern recognition, Data processing, Microcomputers, Data acquisition, Muscles, Site selection, Electrodes  
  
IDENTIFIERS: (U) \*MES(Myoelectric Signals), \*ARIMA(Autoregressive Integrated Moving Average), Alertness, WUAFOSR2313A4, PE01102F  
  
CITY COLL. NEW YORK DEPT OF ELECTRICAL ENGINEERING  
(U) Spread Spectrum, Acquisition and Tracking.  
  
DESCRIPTIVE NOTE: Annual technical rept. 1 Mar 83-29 Feb 84.

FEB 84 58P

PERSONAL AUTHORS: Schilling, D. L. ;

REPORT NO. RF-447105

CONTRACT NO. AFOSR-83-0102

PROJECT NO. 2305

TASK NO. B3

MONITOR: AFOSR  
TR-84-0704

UNCLASSIFIED REPORT

ABSTRACT: (U) This report discusses the following subjects: A New Rapid Acquisition Technique for Direct Sequence Spread Spectrum Communications. The rapid acquisition technique described here can be used in direct sequence spread spectrum systems. The technique employs a double threshold which defines when a decision can be made. These thresholds change at each examination instant. Using this technique a significant reduction in the acquisition time of a direct sequence spread spectrum signal is obtained. A New Double Threshold Acquisition Scheme Applied to the Fading Channel in Frequency Hopping Spread Spectrum.

DESCRIPTORS: (U) \*Spread spectrum, \*Acquisition, \*Frequency shift, \*Tracking, \*Frequency agility, Fading(Electromagnetic Waves), Threshold effects, Channels, Time

IDENTIFIERS: (U) WUAFOSR2305B3, PE01102F

IAC NO. GC-840841

IAC DOCUMENT TYPE: GACIAC - MICROFICHE --

IAC SUBJECT TERMS: Q--(U)Spread spectrum, Communication,

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**Acquisition, Tracking(position), Threshold, Decisions,  
Frequency hopping, Signal processing, Simulation;**

**COLUMBIA UNIV NEW YORK DEPT OF ELECTRICAL ENGINEERING  
(U) Direct Writing of Microstructures for Microelectronics.**

**DESCRIPTIVE NOTE:** Rept. no. 1 (Final), 1 Jan 81-31 Dec 83,

**JUL 84 89P**

**PERSONAL AUTHORS:** Osgood, R. M. Jr;

**CONTRACT NO.** F49620-82-K-0008, ARPA Order-4487

**PROJECT NO.** 2301

**TASK NO.** A1

**MONITOR:** AFOSR  
TR-84-0835

**UNCLASSIFIED REPORT**

**ABSTRACT:** (U) A program to investigate direct laser writing for semiconductor processing is described. In this program the following results were obtained: The first reported fabrication of submicrometer diffraction gratings in GaAs; Development of a new technique for writing patterns of the dielectric material, SiO<sub>2</sub>; Measurement of the conductivity and properties of metal interconnects; The first demonstration of laser-enhanced plasma etching; and The first observation of deep-UV enhanced liquid etching of GaAs.

**DESCRIPTORS:** (U) \*Writing, \*Lasers, \*Semiconductors, Microelectronics, Microstructure, Dielectrics, Processing, Fabrication, Etching, Patterns, Gratings(Spectra), Gallium arsenides, Diffraction

**IDENTIFIERS:** (U) Plasma etching, MUAFOSR2301A1, PEB1102F

**DTIC REPORT BIBLIOGRAPHY**

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DTIC REPORT BIBLIOGRAPHY	SEARCH CONTROL NO.	EVI19B
AD-A144 527	5/10	AD-A144 525
MEDICAL RESEARCH INST OF SAN FRANCISCO CA	20/7	20/9
(U) The Mechanism of Human Velocity Discrimination.		MARYLAND UNIV COLLEGE PARK DEPT OF ELECTRICAL ENGINEERING
DESCRIPTIVE NOTE: Annual scientific rept. 1 Oct 63-30 Mar 84.		(U) Investigation of Ion Beam Production and Acceleration Using Linear Electron Beams and a Pulse Powered Plasma Focus.
APR 84	11P	DESCRIPTIVE NOTE: Final progress rept. 1 Apr 83-31 Mar 84.
PERSONAL AUTHORS: McKee, S. P. ;	MAR 84	MAR 84
CONTRACT NO. AFOSR-82-0345		73P
PROJECT NO. 2313	CONTRACT NO. AFOSR-83-0145	
TASK NO. A5	PROJECT NO. 2301	
MONITOR: AFOSR	TASK NO. A7	
TR-84-0702	MONITOR: AFOSR	
	TR-84-0641	

UNCLASSIFIED REPORT

ABSTRACT: (U) Human velocity discrimination depends on the precise detection of minute time variations (under 1 msec). A physiological summation process called 'sequential recruitment' is responsible for this remarkable temporal sensitivity. Precise velocity discrimination is possible with very brief target durations (less than 100 msec). The oculomotor systems used this sensory signal to initiate smooth pursuit eye movements.

DESCRIPTORS: (U) \*Velocity, \*Discrimination, \*Visual perception, Motion, Targets, Moving targets, Judgement(Psychology), Performance(Human)

IDENTIFIERS: (U) Stereopsis, WUAFOSR2313A5, PE81102F

UNCLASSIFIED REPORT

ABSTRACT: (U) An intense relativistic electron beam cannot propagate in a metal drift tube when the current exceeds the space charge limit. Very high charge density and electric field gradients (100 to 1000 MV/m) develop at the beam front and the electrons are reflected. When a neutral gas or a plasma is present, collective acceleration of positive ions occur, and the resulting charge neutralization enables the beam to propagate. Experimental results, theoretical understanding, and schemes to achieve high ion energies by external control of the beams front velocity will be reviewed. (Author)

DESCRIPTORS: (U) \*Ion beams, \*Propagation, \*Electron beams, \*Plasma accelerators, Tubes, Magnetic fields, Experimental data, Theory, Currents, Space charge, Electric fields, Gradients, Charge density, High density, Electrodes, Metals, Particle accelerator components, Cations

IDENTIFIERS: (U) WUAFOSR2301A7, PE81102F

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TECHNICAL REPORT SUMMARY. (U) AIR FORCE OFFICE OF  
SCIENTIFIC RESEARCH BOLLING AFB DC B J WERT JAN 85

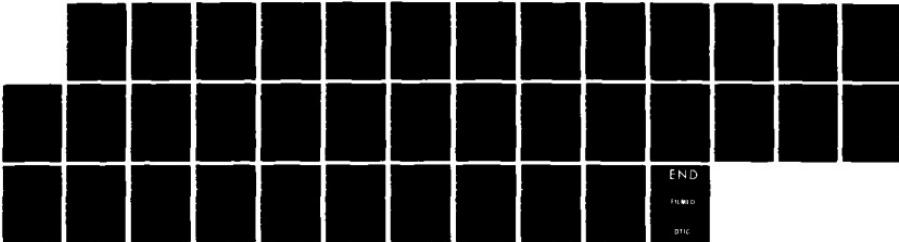
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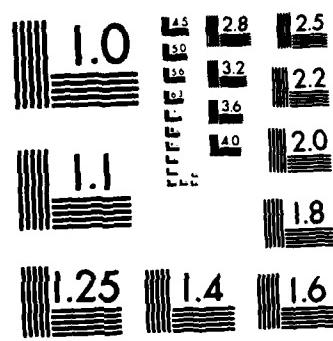
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MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS 1963-A

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AD-A144 508	7/4	DTIC REPORT BIBLIOGRAPHY	SEARCH CONTROL NO.	EVI19B
COLORADO UNIV AT BOULDER		AD-A144 505	7/5	
(U) Flowing Afterglow Studies of Ion Reaction Dynamics Using Infrared Chemiluminescence and Laser-induced Fluorescence.		VIRGINIA UNIV CHARLOTTESVILLE DEPT OF CHEMISTRY		
84	35P	R. ; PERSONAL AUTHORS: Blubaum, V. M. ; Ellison, G. B. ; Leone, S.	PERSONAL AUTHORS: Bueli, S. L. ; Demas, J. N. ;	
		CONTRACT NO. F49620-83-C-0013	CONTRACT NO. AFOSR-78-3590	
		PROJECT NO. 2303	PROJECT NO. 2303	
		TASK NO. B1	TASK NO. B2	
		MONITOR: AFOSR	MONITOR: AFOSR	
		TR-84-0873	TR-84-0882	

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Gas Phase Ion Chemistry, v3 ch17 p1-39 1984.

Reprint: Flowing Afterglow Studies of Ion Reaction Dynamics Using Infrared Chemiluminescence and Laser-Induced Fluorescence.

DESCRIPTORS: (U) \*Afterglows. \*Ions. \*Chemical reactions. Chemiluminescence. Laser induced fluorescence. Molecular vibration. Reprints. Infrared radiation

IDENTIFIERS: (U) \*Ion molecule reactions. \*Flowing afterglows. MUAFOSR2303A1. PEE1102F

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Physical Chemistry, v87 n23 p4875-4881 1983.

Reprint: Heterogeneous Preparation of Singlet Oxygen Using an Ion-Exchange-Resin-Bound Tris(2,2'-bipyridine)-ruthenium(II) Photosensitizer.

DESCRIPTORS: (U) \*Photosensitivity. \*Oxygen. \*Synthesis(Chemistry). Production, ion exchange resins. Ruthenium compounds. Reprints. Catalysts

IDENTIFIERS: (U) Photocatalysts. MUAFOSR2303B2. PEE1102F

## UNCLASSIFIED

AD-A144 487	20/10	DTIC REPORT BIBLIOGRAPHY	SEARCH CONTROL NO. EVI19B
NEW ORLEANS UNIV LA		AD-A144 484	5/10
(U) Zeeman Studies of Shallow Donors and Excitons in Quantum Wells.		CARNEGIE-MELLON UNIV PITTSBURGH PA DEPT OF BIOMEDICAL ENGINEERING	
DESCRIPTIVE NOTE: Final rept. 1 May 83-29 Feb 84.		(U) Gaze Control during Horizontal and Vertical Target Tracking.	
MAR 84	25P	MAR 84	23P
PERSONAL AUTHORS:	Greene, R. L. ;	PERSONAL AUTHORS:	Bahill, A. T. ;
CONTRACT NO.	AFOSR-83-0120	CONTRACT NO.	AFOSR-83-0137
PROJECT NO.	2308	PROJECT NO.	2313
TASK NO.	D9	TASK NO.	D9
MONITOR:	AFOSR TR-84-0827	MONITOR:	AFOSR TR-84-0898

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) A theoretical study has been made of the shallow donor and Wannier exciton within a one-dimensional quantum well. The variational method was used with a cylindrical Gaussian basis set. In order to facilitate comparison with future experimental measurements of excited states of these systems, an external magnetic field was assumed perpendicular to the interfaces between the barrier material and the well. Calculations reveal that the choice of matching conditions used at the interfaces has little effect on the binding energies of the ground or first few excited states of the shallow donor, except for well widths considerably smaller than the effective Bohr radius. The results of calculations of the shallow donor ground and first few excited states are presented for a variety of well sizes and magnetic field strengths. Similar results are given for the ground state of the Wannier exciton. (Author)

**DESCRIPTORS:** (U) \*Zeeman effect, \*Excitons, \*Quantum electronics, Ground state, Shallowness, Electron donors, Excitation, Barriers, Magnetic fields, One dimensions, Interfaces, Semiconductors, Gallium arsenides, Nuclear binding energy

**IDENTIFIERS:** (U) Quantum wells, PEG1102F, MUAFOSR2306D9

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## UNCLASSIFIED

AD-A144 487	20/10	DTIC REPORT BIBLIOGRAPHY	SEARCH CONTROL NO. EVI19B
NEW ORLEANS UNIV LA		AD-A144 484	5/10
(U) Zeeman Studies of Shallow Donors and Excitons in Quantum Wells.		CARNEGIE-MELLON UNIV PITTSBURGH PA DEPT OF BIOMEDICAL ENGINEERING	
DESCRIPTIVE NOTE: Final rept. 1 May 83-29 Feb 84.		(U) Gaze Control during Horizontal and Vertical Target Tracking.	
MAR 84	25P	MAR 84	23P
PERSONAL AUTHORS:	Greene, R. L. ;	PERSONAL AUTHORS:	Bahill, A. T. ;
CONTRACT NO.	AFOSR-83-0120	CONTRACT NO.	AFOSR-83-0137
PROJECT NO.	2308	PROJECT NO.	2313
TASK NO.	D9	TASK NO.	D9
MONITOR:	AFOSR TR-84-0827	MONITOR:	AFOSR TR-84-0898

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) The Honeywell oculometer has a noise level of about 0.1 deg(2). Eye tracking is noisier than head tracking; vertical eye tracking is noisier than horizontal eye tracking. It has about 25% crosstalk of the horizontal channel into the vertical channel. It has an 84 ms time delay. It is not effective at detecting and rejecting eye blinks; typical eye blink artifacts last 50 to 200 ms. The human tracks best when tracking with eyes alone. Although tracking with head and eyes should be more natural, the human does worse when he uses his head. Head only tracking is the worst of the three conditions.

**DESCRIPTORS:** (U) \*Optical tracking, \*Oculometers, \*Eye movements, Eye, Performance(Human), Operation, Head(Anatomy), Test methods

**IDENTIFIERS:** (U) PEG1102F, MUAFOSR2313D9

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AD-A144 483 12/1

WISCONSIN UNIV-MADISON DEPT OF COMPUTER SCIENCES

(U) Iterative Methods for Elliptic Problems and the Discovery of 'q'.

DESCRIPTIVE NOTE: Technical rept..

JUL 84 48P

PERSONAL AUTHORS: Parter, S. V. ;

REPORT NO. CSTR-548

CONTRACT NO. AFOSR-82-0275

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR

TR-84-0838  
UNCLASSIFIED REPORT

ABSTRACT: (U) This document considers a direct iterative method for solving the linear system  $Au = y$  which arises from the discretization of a boundary value problem involving an elliptic partial differential operator  $L$  of order 2m.

DESCRIPTORS: (U) \*Iterations, \*Ellipses, \*Linear systems, \*Problem solving, Boundary value problems, Operators(Mathematics), Differential equations, Approximation(Mathematics), Estimates, Finite element analysis, Matrices(Mathematics), Eigenvalues, Finite difference theory

IDENTIFIERS: (U) MIAFOSR2304A3, PE01102F

SEARCH CONTROL NO. EVI19B

AD-A144 482 20/4

CALIFORNIA INST OF TECH PASADENA

(U) Experimental Investigation on the Effects of Chemical Heat Release in the Reacting Turbulent Plane Shear Layer.

DESCRIPTIVE NOTE: Doctoral thesis.

JAN 81 12SP

PERSONAL AUTHORS: Wallace, A. K. ;

CONTRACT NO. F49620-79-C-0159

PROJECT NO. 2307

TASK NO. A3

MONITOR: AFOSR

TR-84-0850  
UNCLASSIFIED REPORT

ABSTRACT: (U) A chemically reacting shear layer between various gases was investigated in a new type of blow-down wind tunnel. The gas streams were inert (helium, nitrogen or argon), but carried up to 10% concentration of reactants, one being ozone and the other nitric oxide. The resulting reaction,  $O_3 + NO$  yields  $NO_2 + O_2$ , was essentially diffusion limited and spontaneous, enabling the temperature rise to be varied at will from zero up to 200 °C mean. Flows of Reynolds number up to  $5 \times 10^6$  to the fourth power were investigated.

DESCRIPTORS: (U) \*Turbulent boundary layer, \*Chemical reactions, \*Heat of reaction, Shear properties, Layers, Blowdown, Wind tunnels, Reynolds number, Flow, Helium, Argon, Gases, Ozone, Nitrogen oxides

IDENTIFIERS: (U) MIAFOSR2307A3, PE61102F

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DTIC REPORT BIBLIOGRAPHY

AD-A144 481 20/5 DARTMOUTH COLL HAROVER N H DEPT OF PHYSICS AND ASTRONOMY  
(U) High Power Millimeter Wavelength Coherent Radiation Sources.  
DESCRIPTIVE NOTE: Scientific rept. 1 Feb 83-31 Jan 84.  
JUN 84 7SP PERSONAL AUTHORS: Walsh, J. E.;  
CONTRACT NO. AFOSR-82-0168  
PROJECT NO. 2301  
TASK NO. A8  
MONITOR: AFOSR TR-84-0875  
UNCLASSIFIED REPORT

SEARCH CONTROL NO. EVI19B  
AD-A144 477 7/3 7/2  
GEORGIA UNIV ATHENS DEPT OF CHEMISTRY  
(U) Bis(dialkylamino)phosphines.

PERSONAL AUTHORS: King, R. B.; Sundaram, P. M.;  
CONTRACT NO. AFOSR-81-0051  
PROJECT NO. 2303  
TASK NO. B2  
MONITOR: AFOSR TR-84-0875  
UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. In Jnl. of Organic Chemistry.  
v49 n10 p1784-1798 1984.  
Reprint: Bis(dialkylamino)phosphines.

DESCRIPTORS: (U) \*Phosphine, Chemical reactions,  
Stereochimistry, Reprints

IDENTIFIERS: (U) \*Phosphine/Bis(Dialkylamino), Steric

hindrance,

Lithium aluminum hydride,

AFOSR2303B2,

PE81102F

ABSTRACT: (U) During the reporting period, Cerenkov

baser resonators with a rectangular configuration were

analyzed, constructed and experimentally tested. All of

the previous work was based upon cylindrical resonators,

a choice which was convenient because of the intrinsic

symmetry of the beam transport and focussing. In many

potential applications, however, an amplifier would be

more useful than a oscillator and a structure which,

coupled to a linearly-polarized field would then be far

more convenient. It was for this purpose that the

rectangular dielectric slab waveguide structures were

analyzed and tested.

DESCRIPTORS: (U) \*Lasers, \*Millimeter Waves, Resonators,

Coherent electromagnetic radiation, Beams(Electromagnetic)

\*Waveguides, Electron beams, Cerenkov radiation, High

power

IDENTIFIERS: (U) AFOSR2301A8, PE81102F

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DTIC REPORT BIBLIOGRAPHY

AD-A144 476 7/5

VIRGINIA UNIV CHARLOTTESVILLE DEPT OF CHEMISTRY

(U) Interactions of Ruthenium(II) Photosensitizers with Nonionic Surfactants: The Binding Region and Specific Anion Effects.

84

6P

PERSONAL AUTHORS: Haunstein, B. L., Jr.; Dressick, W. J.; Gilbert, T. B.; Dennis, J. N.; Degraff, B. A.

CONTRACT NO. AFOSR-78-3590, NSF-CHE82-08279

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR  
TR-84-0878

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. In Jnl. of Physical Chemistry,  
v88 n8 p1902-1905 1984.

Reprint: Interactions of Ruthenium(II) Photosensitizers with Nonionic Surfactants: The Binding Region and Specific-Anion Effects.

DESCRIPTORS: (U) \*Photosensitivity, \*Surface active substances, \*Ruthenium compounds, Covalent bonds, Anions, Molecule molecule interactions, Reprints

IDENTIFIERS: (U) Micelles, WUAFOSR2303B2, PE81102F

SEARCH CONTROL NO. EVI198

AD-A144 475 7/5

COLUMBIA UNIV NEW YORK DEPT OF CHEMISTRY

(U) Energetics and Dynamics of Radical Pairs in Micelles. Measurement of the Average Singlet-Triplet Energy Gap by Means of the Magnetic Field Dependence of <sup>(13)C</sup>CIDNP.

84 4P

PERSONAL AUTHORS: Zimmt, M. B.; Doubleday, C.; Jr.; Turro, N. J.;

CONTRACT NO. AFOSR-81-0013

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR  
TR-84-0861

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. In Jnl. of the American Chemical Society, v108 n11 p3363-3365 1984.

Reprint: Energetics and Dynamics of Radical Pairs in Micelles. Measurement of the Average Singlet-Triplet Energy Gap by Means of the Magnetic Field Dependence of <sup>(13)C</sup>CIDNP.

DESCRIPTORS: (U) \*Photolysis, Free radicals, Carbon, Radioactive isotopes, Magnetic fields, Energetic properties, Dynamics, Reprints

IDENTIFIERS: (U) Micelles, WUAFOSR2303B2, PE81102F

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LOUISIANA STATE UNIV BATON ROUGE DEPT OF PHYSICS AND  
ASTRONOMY      CALIFORNIA INST OF TECH PASADENA SEISMOLOGICAL LAB

(U) Two New Extremely Hot Pulsating White Dwarfs.

APR 84      SP

PERSONAL AUTHORS: Bond, H. E. ; Grauer, A. D. ; Green, R. F. ;  
Libert, J. W. ;

CONTRACT NO. AFOSR-82-0192

PROJECT NO. 2301

TASK NO. A2

MONITOR: AFOSR  
TR-84-0845

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. In Astrophysical Jnl., v279 n2  
p781-787, 15 Apr 84.

Reprint: Two New Extremely Hot Pulsating White Dwarfs.

DESCRIPTORS: (U) \*Dwarf stars, Photometry, Ultraviolet  
spectra, Reprints

IDENTIFIERS: (U) White dwarf stars, MUAFOSR2301A2,  
PE81102F

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. In Bulletin of the Seismological  
Society of America, v74 n3 p843-862 Jun 84.

Reprint: Source Models and Yield-Scaling Relations for  
Underground Nuclear Explosions at Amchitka Island.

DESCRIPTORS: (U) \*Nuclear explosion testing, \*Seismic  
data, Broadband, Aleutian Islands, Sources, Depth,  
Underground explosions, Yield(Nuclear explosions),  
Scaling factors, Mathematical models, Reprints

IDENTIFIERS: (U) Amchitka Island, MUAFOSR4397A3,  
PE81102F

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21/8.2

ILLINOIS UNIV AT URBANA DEPT OF MECHANICAL AND INDUSTRIAL  
ENGINEERING

(U) Deflagration to Shock to Detonation Transition of  
Energetic Propellants.

DESCRIPTIVE NOTE: Annual technical rept., 1 Jun 83-30 May  
84.

JUL 84

44P

PERSONAL AUTHORS: Krier, H. ; Butler, P. B. ; Cudak, C. ;

REPORT NO. UILU-ENG-84-4008

CONTRACT NO. AFOSR-81-0145

PROJECT NO. 2308

TASK NO. A1

MONITOR: AFOSR  
TR-84-0834

UNCLASSIFIED REPORT  
TR-84-0834

Availability: Document partially illegible.

ABSTRACT: (U) It is well known that explosive-based propellants are susceptible to detonation from the controlled deflagration mode of combustion. In some instances a confined zone of granulated propellant adjacent to a zone of cast propellant can provide a rapid enough pressure-rise rate to shock initiate the cast material. If the cast propellant has voids, the detonation will initiate at some location ahead of the granulated bed/cast material interface. This report is a summary of the research activities that focus on the analysis and modeling of the physics of such highly transient flows.

DESCRIPTORS: (U) \*Deflagration, \*Solid rocket propellants, \*Detonations, Castings, Transitions, Models, Physics, Flow, Transients, Shock (Mechanics), Explosives, Voids

IDENTIFIERS: (U) PEE1102F, MUAFOSR2304A1

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AD-A144 485

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WISCONSIN UNIV-MADISON DEPT OF COMPUTER SCIENCES

(U) A Study of Some Multi-Grid Ideas.

DESCRIPTIVE NOTE: Technical rept.,

JUN 84

48P

PERSONAL AUTHORS: Kamowitz, D. ; Parter, S. V. ;

REPORT NO. CSTR-545

CONTRACT NO. AFOSR-82-0275

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR  
TR-84-0837

UNCLASSIFIED REPORT

ABSTRACT: (U) In an effort to understand certain ideas and concepts associated with multi-grid iterations the authors give an in-depth study of a particular simple problem. They consider a standard finite-difference system associated with a two-point boundary value problem. - $(pu' + bu' + qu) + q(u(0) - u(1)) = 0$ . The operators  $I_{h2}$ ,  $I_{h2}$  are 'operator', based interpolation and projection operators while the smoothers are the damped Jacobi iterations with parameter  $\alpha > 0$ . This document determines the exact rates of convergence for the two-grid scheme and upper bounds for the multi-grid schemes. Experimental results are discussed. (Author)

DESCRIPTORS: (U) \*Grids, \*Iterations, \*Finite difference theory, Operators(Mathematics), Boundary value problems, Partial differential equations, Interpolation, Convergence, Eigenvectors, Experimental data, Estimates

IDENTIFIERS: (U) PEE1102F, MUAFOSR2304A3

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DTIC REPORT BIBLIOGRAPHY

AD-A144 458 7/3 7/4

VIRGINIA UNIV CHARLOTTESVILLE DEPT OF CHEMISTRY

(U) Properties of Osmium(II) Photosensitizers in Aqueous and Sodium Lauryl Sulfate Micellar Media.

84 SP

63 20P

PERSONAL AUTHORS: Dressick, W. J.; Raney, K. W.; Dennis, J. N.  
; Degraff, B. A. ;

CONTRACT NO. AFOSR-78-3580, NSF-CHE82-08249

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR  
TR-84-0878

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Inorganic Chemistry, v23 n7  
P875-880 1984.

Reprint: Properties of Osmium(II) Photosensitizers in Aqueous and Sodium Lauryl Sulfate Micellar Media.

DESCRIPTORS: (U) \*Photosensitivity, \*Electrochemistry,  
\*Photochemical reactions, \*Spectroscopy, \*Osmium compounds, Complex compounds, Solar energy, Reprints

IDENTIFIERS: (U) Micelles, PE81102F, WUAFOSR2303B2

SEARCH CONTROL NO. EVI19B

AD-A144 457 12/1

WASHINGTON UNIV SEATTLE DEPT OF MATHEMATICS

(U) Deterministic and Stochastic Optimization Problems of Bolza Type in Discrete Time,

PERSONAL AUTHORS: Rockafellar, R. T.; Wets, R. J. B. ;

CONTRACT NO. F49620-82-K-0012

PROJECT NO. 2304

TASK NO. A6

MONITOR: AFOSR  
TR-84-0804

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Stochastics, v10 p273-312  
1983.

Reprint: Deterministic and Stochastic Optimization Problems of Bolza Type in Discrete Time.

DESCRIPTORS: (U) \*Calculus of variations, \*Determinants(Mathematics), \*Stochastic processes, Optimization, Dynamic programming, Lagrangian functions, Multiplication, Reprints

IDENTIFIERS: (U) Bolza type, PE81102F, WUAFOSR2304AB

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DTIC REPORT BIBLIOGRAPHY				SEARCH CONTROL NO.	EVI19B
OKLAHOMA STATE UNIV	STILLWATER	DEPT OF CHEMISTRY		AD-A144 455	12/1
(U) Theoretical Investigations of Elementary Processes in the Chemical Vapor Deposition of Silicon from SiH4, Unimolecular Decomposition of SiH4.				FLORIDA STATE UNIV	TALLAHASSEE DEPT OF STATISTICS
MAY 84	13P			(U) Negative Association of Random Variables, with Applications,	
PERSONAL AUTHORS:	Viswanathan, R. ; Thompson, D. L. ; Raff, L. M. ;			PERSONAL AUTHORS:	Joag-Dev, K. ; Prosschan, F. ;
CONTRACT NO.	AFOSR-82-0311			CONTRACT NO.	F49620-82-K-0007
PROJECT NO.	2303			PROJECT NO.	2304
TASK NO.	A2			TASK NO.	A5
MONITOR:	AFOSR TR-84-0686			MONITOR:	AFOSR TR-84-0685
					UNCLASSIFIED REPORT
SUPPLEMENTARY NOTE:	Pub. in Jnl. of Chemical Physics, v80 no p4230-4240, 1 May 84.			SUPPLEMENTARY NOTE:	Pub. in the Annals of Statistics n1 P286-285 1983.
Reprint:	Theoretical Investigations of Elementary Processes in the Chemical Vapor Deposition of Silicon from Silane. Unimolecular Decomposition of SiH4.			Reprint:	Negative Association of Random Variables, with Applications.
Descriptors:	(U) *Silicon, *Vapor deposition, Silanes, Decomposition, Dynamics, Theory, Reprints			Descriptors:	(U) *Random variables, Multivariate analysis, Inequalities, Statistical distributions, Reprints
Identifiers:	(U) ACVD(Chemical Vaper Deposition), PEB1102F, WUAFOSR2303A2			Identifiers:	(U) Negative association, PEB1102F, WUAFOSR2304A5

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AD-A144 438      6/18      12/1      AD-A144 438      21/2      20/4      21/8.2      12/1  
WASHINGTON UNIV SEATTLE DEPT OF PSYCHOLOGY      PRINCETON COMBUSTION RESEARCH LABS INC NU  
(U) Mathematical Models of the Event Related Potential.  
DESCRIPTIVE NOTE: Interim rept. 30 Sep 83-1 Apr 84.  
APR 84      34P  
PERSONAL AUTHORS: Hunt, E. B.;  
CONTRACT NO. AFOSR-83-0289  
PROJECT NO. 2313  
TASK NO. A4  
MONITOR: AFOSR TR-84-0899  
UNCLASSIFIED REPORT  
SEARCH CONTROL NO. EVI19B  
AD-A144 438      21/2      20/4      21/8.2      12/1  
PRINCETON COMBUSTION RESEARCH LABS INC NU  
(U) Analysis of Combustion Oscillations in Heterogeneous Systems.  
DESCRIPTIVE NOTE: Final rept. 15 Mar 82-14 Mar 83.  
NOV 83      61P  
PERSONAL AUTHORS: Ben-Reuvan, M.; Summerfield, M.;  
REPORT NO. PCRL-FR-83-005  
CONTRACT NO. F49620-82-C-0062  
PROJECT NO. 2308  
TASK NO. A1  
MONITOR: AFOSR TR-84-0700  
UNCLASSIFIED REPORT

ABSTRACT: (U) In electrophysiology, the Event Related Potential is assumed to be composed of several underlying component wave forms. Principal Component Analysis is a statistical technique that has been used to uncover the components by analysis of the observed wave form. The mathematical assumptions behind Principal Component Analysis are examined, and their plausibility is questioned. It is pointed out that under certain conditions the component forms may not accurately be recovered by Principal Component Analysis. Under other circumstances violations of some of the mathematical assumptions does not appear to affect the accuracy of recovery of component waveforms. The points made are illustrated by an analysis of simulated wave forms constructed from known components.

DESCRIPTORS: (U) \*Electroencephalography, \*Statistical analysis, Accuracy, Waveforms, Electrophysiology, Simulation, Mathematical models

IDENTIFIERS: (U) Event related potential, Principal component analysis, PEG1102F, WUAFOSR2313A4

UNCLASSIFIED REPORT  
ABSTRACT: (U) This analysis is aimed at the near-wall processes in an injected, axisymmetric, viscous flow. It is a part of an overall study of solid propellant rocket instability, in which cold flow simulation is evaluated as a tool to elucidate possible instability-driving mechanisms. One such prominent mechanism seems to be visco-acoustic coupling, as indicated by earlier detailed order of magnitude analysis. The major component of the overall study involves numerical simulation of the full set of coreflow equations of motion (unsteady, axisymmetric) by a modified MacCormack integration technique. To clarify some of the physical interactions inherent in the various regimes of the flow field, two (separate) singular perturbation analyses have been carried out. The head-end boundary regime, and the injected sidewall layer, both involve appreciable viscous dissipation, and hence are characterized by predominantly parabolic differential systems. The inverse square root of the injection Reynolds number serves as a small-perturbation quantity.

DESCRIPTORS: (U) \*Axially symmetric flow, \*Viscous flow, \*Boundary layer flow, Combustion, Oscillation, Heterogeneity, Integration, Numerical analysis, Solid propellant rocket

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STANFORD UNIV CA DEPT OF COMPUTER SCIENCE

**IDENTIFIERS:** (U) Naccarack Integration technique, Instability, Viscousacoustic coupling, Core flow, Near wall combustion. PEG1102F, WUAFOSR2308A1

**ABSTRACT:** (U) We examine methods of implementing queries about relational databases in the case that these queries are expressed in first-order logic as a collection of Horn clauses. Because queries may be defined recursively, straightforward methods of query evaluation do not always work, and a variety of strategies have been proposed to handle subsets of recursive queries. We shall express such query evaluation techniques as 'capture rules' on a graph representing clauses and predicates. The essential property of capture rules is that they can be applied independently, thus providing a clean interface for query-evaluation systems that use several different strategies in different situations. We show how rules suggested previously can be fit into this framework, and we propose some new capture rules and generalizations of old ones.

REPORT NO. STAN-CS-84-1000  
CONTRACT NO. AFOSR-80-0212  
PROJECT NO. 2304  
TASK NO. A7  
MONITOR: AFOSR TR-84-0840

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) We examine methods of implementing queries about relational databases in the case that these queries are expressed in first-order logic as a collection of Horn clauses. Because queries may be defined recursively, straightforward methods of query evaluation do not always work, and a variety of strategies have been proposed to handle subsets of recursive queries. We shall express such query evaluation techniques as 'capture rules' on a graph representing clauses and predicates. The essential property of capture rules is that they can be applied independently, thus providing a clean interface for query-evaluation systems that use several different strategies in different situations. We show how rules suggested previously can be fit into this framework, and we propose some new capture rules and generalizations of old ones.

**DESCRIPTORS:** (U) \*Data bases, \*Interrogation, \*Data management, \*Information processing, Graphs, Logic, Recursive functions, Man computer interface, Programming languages, Strategy, Language  
**IDENTIFIERS:** (U) Horn clauses, \*Query languages, Relational data bases, Recursive queries, Capture rules, PEG1102F, WUAFOSR2304A7

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AD-A144 414	12/2	9/2			SEARCH CONTROL NO. EV119B		
SRI INTERNATIONAL	MENLO PARK CA				AD-A144 405	20/6	7/5
(U) Research on Parallelism in Problem-Solving Systems.							
DESCRIPTIVE NOTE: Annual rept., 1 Sep 82-31 Aug 83.							
JUL 84	9P				PERSONAL AUTHORS:	Love, J. C.; Demas, J. N.	
PERSONAL AUTHORS:		Wilkins, D. E.			CONTRACT NO.	AFOSR-78-3590, NSF-CHE82-06279	
CONTRACT NO.		F49620-78-C-0188			PROJECT NO.	2303	
PROJECT NO.		2304			TASK NO.	B2	
TASK NO.		A7			MONITOR:	AFOSR	
MONITOR:		AFOSR TR-84-0595				TR-84-0877	

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) This report describes the progress to date on work to date under the contract. Research on planning and problem-solving systems was begun at SRI International in September 1978. Progress has been described in detail in three annual reports (1980, 1981, and 1982). The main task of this research program is to develop powerful methods of representing, generating and executing hierarchical plans that contain parallel actions. Execution involves monitoring the state of the world and possibly replanning if things do not proceed as expected. Two different approaches to these problems are being pursued under this contract. The first is heuristic; it involves building an actual computer program that provides a representation from which it then generates plans. This approach comprises the majority of the effort on this project. The second approach is to investigate the theoretical foundations of planning. This will not, in all likelihood, result in a program, but it will formalize the planning problem and one solution to it. (Author)

**DESCRIPTORS:** (U) \*Problem solving, \*Hierarchies, \*Planning, Heuristic methods, Research management, Robotics, Artificial intelligence, Computer programs, Cognition

**IDENTIFIERS:** (U) SIPE (System For Interactive Planning and Execution Monitoring), PEG1102F, WUAFOSR2304A7

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UNCLASSIFIED	VIRGINIA UNIV CHARLOTTESVILLE	DEPT OF CHEMISTRY
(U) Phase Plane Method for Deconvolution of Luminescence Decay Data with a Scattered-Light Component.		
JUL 83	SP	

## UNCLASSIFIED REPORT

**SUPPLEMENTARY NOTE:** Pub. In Analytical Chemistry, v58 n1 P82-85 1984.  
**Reprint:** Phase Plane Method for Deconvolution of Luminescence Decay Data with a Scattered-Light Component.

**DESCRIPTORS:** (U) \*Fluorescence, \*Luminescence, Convolution, Decay, Light scattering, Computerized simulation, Reprints

**IDENTIFIERS:** (U) \*Deconvolution, Phase plane method, PEG1102F, WUAFOSR2303B2

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AD-A144 404 7/4 DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVI19B  
OKLAHOMA STATE UNIV STILLWATER DEPT OF CHEMISTRY AD-A144 402 7/5 20/5  
(U) Unimolecular Dissociation of Methane: A Trajectory CORNELL UNIV ITHACA NY DEPT OF CHEMISTRY  
Study Using Metropolis Sampling. (U) Deactivation of I(52P1/2) by CF3I, CH3I, C2H5I, and  
CH4.  
JUN 84 12P 84 1OP  
PERSONAL AUTHORS: Raff, L. M.; Viswanathan, R.; Thompson, D. , PERSONAL AUTHORS: Gu, Z. N.; Young, A. T.; Houston, P. L.;  
L.; CONTRACT NO. AFOSR-82-0311 CONTRACT NO. F49620-83-K-0012  
PROJECT NO. 2303 PROJECT NO. 2303  
TASK NO. B1 TASK NO. B1  
MONITOR: AFOSR MONITOR: AFOSR  
TR-84-0872 TR-84-0872  
UNCLASSIFIED REPORT  
SUPPLEMENTARY NOTE: Pub. in International Jnl. of  
Chemical Kinetics, v16 p669-677 1984.  
Reprint: Deactivation of I(52P1/2) by CF3I, CH3I, C2H5I,  
and CH4.  
DESCRIPTORS: (U) \*Photolysis, \*Deactivation, \*Lasers,  
Iodine, Iodides, Alkyl radicals, Relaxation, Reprints  
Chemical reactions, Trajectories, Monte Carlo method,  
Reprints  
IDENTIFIERS: (U) PEG1102F, WUAFOSR2303B1  
(U) \*Unimolecular reactions. PEG1102F.  
WUAFOSR2303A2

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in International Jnl. of  
Chemical Kinetics, v12 p141-6149, 15 Jun 84.  
Reprint: Unimolecular Dissociation of Methane: A  
Trajectory Study Using Metropolis Sampling.  
DESCRIPTORS: (U) \*Chemical dissociation, \*Methane, Rates,  
Chemical reactions, Trajectories, Monte Carlo method,  
Reprints  
IDENTIFIERS: (U) PEG1102F, WUAFOSR2303B1

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DTIC REPORT BIBLIOGRAPHY				SEARCH CONTROL NO.	EVI198
AD-A144 401	20/6	20/5	AD-A144 400	8/7	18/3
CHICAGO UNIV IL	JAMES FRANCK INST		CALIFORNIA INST OF TECH PASADENA SEISMOLOGICAL LAB		8/11
(U)	Shot-Noise-Limited Detection Scheme for Two-Beam Laser Spectroscopies.		(U) The Effects of Tectonic Release on Short-Period P Waves from NTS Explosions.		
JAN 84	SP		JUN 84	28P	
PERSONAL AUTHORS:	Andor, L. ; Lorinrez, A. ; Stenion, J. ; Smith, D. O. ; Rice, S. A. ;		PERSONAL AUTHORS:	Lay, T. ; Wallace, T. C. ; Helmberger, D. V.	
CONTRACT NO.	F49620-83-C-0002		CONTRACT NO.	F49620-83-C-0025	
PROJECT NO.	2303		PROJECT NO.	4397	
TASK NO.	B1		TASK NO.	A3	
MONITOR:	AFOSR TR-84-0887		MONITOR:	AFOSR TR-84-0886	

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. In Rev. Sci. Instrum., v55 n1 p84-87 Jan 84.

Reprint: Shot-Noise-Limited Detection Scheme for Two-Beam Laser Spectroscopies.

DESCRIPTORS: (U) \*Short noise, \*Detection, Demodulation, Linearity, Response, Reprints

IDENTIFIERS: (U) \*Laser spectroscopy, \*Two beam laser spectroscopy, PEG1102F, WUAFOSR2303B1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. In Bulletin of the Seismological Society of America, v74 n3 p819-842 Jun 84.

Reprint: The Effects of Tectonic Release on Short-Period P Waves from NTS Explosions.

DESCRIPTORS: (U) \*Primary waves(Seismic waves), \*Faults(Geology), Tectonics, Release, Joints, Nuclear explosion testing, Seismic data, Azimuth, Amplitude, Earth models, Underground explosions, Nevada, Reprints

IDENTIFIERS: (U) Parute Mesa, Tectonic release, PEG1102F, WUAFOSR4397A3

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7/4

UNITED TECHNOLOGIES RESEARCH CENTER EAST HARTFORD CT

(U) Electronic Structure of the Helium Molecular Anion He2.

DESCRIPTIVE NOTE: Scientific journal article.

APR 84

SP

PERSONAL AUTHORS: Michaels, H. H. ;

REPORT NO. UTRC-928533-2

CONTRACT NO. F49620-83-C-0094

PROJECT NO. 2301

TASK NO. A7

MONITOR: AFOSR  
TR-84-0858

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Physical Review Letters, v52  
n16 p1413-1416, 18 Apr 84.

Reprint: Electronic Structure of the Helium Molecular  
Anion He2.

DESCRIPTORS: (U) \*Helium, \*Anions, \*Molecular structure,  
Potential energy, Wave functions, Reprints

IDENTIFIERS: (U) \*Electronic structure, PEG1102F,  
WUAFOSR2301A7

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TEXAS TECH UNIV LUBBOCK

(U) Electrode Erosion Phenomena in a High-Energy Pulsed  
Discharge.

MAR 84

12P

PERSONAL AUTHORS: Donaldson, A. L.; Hagler, M. O.;  
Kristiansen, M.; Jackson, G.; Hatfield, L. ;

CONTRACT NO. AFOSR-84-0015

PROJECT NO. 2301

TASK NO. A7

MONITOR: AFOSR  
TR-84-0843

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE Transactions on Plasma  
Science, vps-12 n1 p28-38 Mar 84.

Reprint: Electrode Erosion Phenomena in a High-Energy  
Pulsed Discharge.

DESCRIPTORS: (U) \*Electrodes, \*Electric discharges,  
Erosion, Pulses, Spark gaps, High energy, Reprints

IDENTIFIERS: (U) PEG1102F, WUAFOSR2301A7

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DTIC REPORT BIBLIOGRAPHY		SEARCH CONTROL NO.	EVI19B
AD-A144 388	20/8	AD-A144 380	12/1
OREGON UNIV	EUGENE	FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS	
(U) Atomic Inner-Shell Transitions.		(U) Random Averaging of Vector Elements.	
APR 84	SP	JUN 84	SP
PERSONAL AUTHORS:	Crasemann, B. ; Chen, M. H. ; Mark, H. ;	PERSONAL AUTHORS:	Proschak, F. ; Shaked, M. ;
CONTRACT NO.	F49620-84-C-0038, ARPA Order-4087	CONTRACT NO.	F49620-82-K-0007, NSF-MCS82-00098
PROJECT NO.	2301	PROJECT NO.	2304
TASK NO.	A4	TASK NO.	A5
MONITOR:	AFOSR TR-84-0857	MONITOR:	AFOSR TR-84-0859

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of the Optical Society of America B, v1 n2 p224-231 Apr 84.

Reprint: Atomic Inner-Shell Transitions.

DESCRIPTORS: (U) \*Nuclear shell models, \*Transitions, Nuclear binding energy, Ions, Relativity theory

IDENTIFIERS: (U) \*Atomic inner shells, WUAFOSR2301A4, PEG1102F

(U) \*Random averaging, PE61102F, WUAFOSR2304AS

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in SIAM Jnl. of Applied Mathematics, v44 n3 p587-590 Jun 84.

Reprint: Random Averaging of Vector Elements.

DESCRIPTORS: (U) \*Vector analysis, Real numbers, Iterations, Reprints

IDENTIFIERS: (U) \*Random averaging, PE61102F, WUAFOSR2304AS

## UNCLASSIFIED

AD-A144 375	20/8	DTIC REPORT BIBLIOGRAPHY	SEARCH CONTROL NO.	EVI198
OREGON UNIV	EUGENE	DEPT OF PHYSICS	AD-A144 368	12/1
(U) N X-Ray Emission Rates in Dirac-Fock Approximation.			20/1	
JUL 84	SP	DELAWARE UNIV	NEWARK	APPLIED MATHEMATICS INST
PERSONAL AUTHORS:	Chen, M. H. ; Crasemann, B. ;	(U) The Inverse Scattering Problem for Time-Harmonic Acoustic Waves.		
CONTRACT NO.	F49620-84-C-0038	PROJECT NO.	AFOSR-81-0103	JUL 84 30P
PROJECT NO.	2301	TASK NO.	2304	PERSONAL AUTHORS: Colton, D. ;
TASK NO.	A4	MONITOR:	AFOSR TR-84-0853	CONTRACT NO. AFOSR-81-0103
MONITOR:	AFOSR TR-84-0855	MONITOR:	AFOSR TR-84-0853	PROJECT NO. 2304
TASK NO. A4				
MONITOR: AFOSR TR-84-0853				

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Physical Review A, v30 n1 p170-178 JUL 84.

Reprint: N X-Ray Emission Rates in Dirac-Fock Approximation.

DESCRIPTORS: (U) \*X rays, \*Emission, Rates, Transitions, Relativity theory, Reprints

IDENTIFIERS: (U) \*Atomic inner shells, Dirac Fock approximation, WUAFOSR2301A4, PEG1102F

IDENTIFIERS: (U) PEG1102F, WUAFOSR2304A4

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in SIAM Review, v26 n3 p323-350 JUL 84.

Reprint: The Inverse Scattering Problem for Time-Harmonic Acoustic Waves.

DESCRIPTORS: (U) \*Inverse scattering, \*Mathematical models, \*Acoustic waves, Operators(Mathematics), Far field, Optimization, Reprints

## UNCLASSIFIED

AD-A144 381	12/1	9/3	DTIC REPORT BIBLIOGRAPHY	SEARCH CONTROL NO. EVI198
			AD-A144 357	20/8
			12/1	
			CARNEGIE-MELLON UNIV PITTSBURGH PA DEPT OF ELECTRICAL ENGINEERING	
			(U) Multi-Disciplinary Techniques for Understanding Time-Varying Space-Based Imagery.	
			DESCRIPTIVE NOTE: Annual rept. 1 May 83-30 May 84.	
			JUN 84	160P
			PERSONAL AUTHORS: Max, M. ; Shan, T. J. ; Kallath, T. ;	
			CONTRACT NO. AFOSR-83-0228	
			PROJECT NO. 2304	
			TASK NO. A6	A7
			MONITOR: AFOSR TR-84-0487	

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) This paper presents new algorithms for estimating the spatio-temporal spectrum of the signals received by a passive array. The algorithms are based on the eigenstructure of the covariance and spectral-density matrices of the received signals. These allow partial correlation between the sources and thus are applicable to certain kinds of multipath problems. Simulation results that illustrate the performance of the new algorithms are presented. (Author)

**DESCRIPTORS:** (U) \*Algorithms, \*Spectrum analysis, Time domain, Computerized simulation, Covariance, Signals, Impingement, Multipath transmission, Covariance, Matrices (Mathematics), Narrowband, Broadband, Two dimensional, Matrices (Mathematics), Narrabend.

**IDENTIFIERS:** (U) Passive arrays, Frequency domain

**ABSTRACT:** (U) A multi-disciplinary program for space-based image processing is reported. This project combines optical and digital processing techniques and pattern recognition, image understanding and artificial intelligence methodologies. Time-change image processing was recognized as the key issue to be addressed. Three time-change scenarios were defined based on the frame rate of the data change. This report details the recent research on: various statistical and deterministic image features; recognition of sub-pixel targets in time-varying imagery, and 3-D object modeling and recognition. (Author)

**DESCRIPTORS:** (U) \*Image processing, \*Space based, Mathematical models, Image registration, Optical processing, Digital systems, Pattern recognition, Artificial intelligence, Scenarios, Targets, Three dimensional, Graphs, Algorithms, Models, Air Force research

**IDENTIFIERS:** (U) Image understanding, Scene analysis, PE81102F, MUAFOSR2304A/

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EV119B

AD-A144 365 9/5

STANFORD UNIV CA INFORMATION SYSTEMS LAB

(U) A New Adaptive Antenna System for Coherent Signals and Interference.

DESCRIPTIVE NOTE: Technical rept.,

OCT 83 SP

PERSONAL AUTHOR: Shan, T. J.; Kellath, T. J.

CONTRACT NO. F49620-79-C-0058, AFOSR-83-0228

PROJECT NO. 2304

TASK NO. A8

MONITOR: AFOSR TR-84-0488

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Presented at the Asilomar Conference (17th), Oct 83. Sponsored in part by Contracts DAAG28-79-C-0218 and DAAG28-81-K-0057.

ABSTRACT: (U) In this paper the authors introduce a new adaptive antenna system able to work well even when the desired signal and the interference are coherent. The present adaptive beamformers fail to operate in these cases. The results of simulations appear to confirm the theoretical predictions. (Author)

DESCRIPTORS: (U) \*Processing equipment, \*Adaptive systems, \*Antenna arrays, \*Beam forming, Computerized simulation, Coherence, Signals, Antennas, Theory, Signals, Predictions, Coherence

IDENTIFIERS: (U) Coherent processors, Weight vectors, Coherent interference, PEB1102F, WUAFOSR2304AB

AD-A144 348 7/4

MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF CHEMISTRY

(U) Stimulated Emission Spectroscopy: A Complete Set of Vibrational Constants for X 1A1 Formaldehyde.

JUN 84 13P

PERSONAL AUTHORS: Reitner, D. E.; Field, R. W.; Kinsey, J. L.; DaI-H. L.

CONTRACT NO. F49620-83-C-0010

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR TR-84-0870

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics. v80 n12 p5988-5978, 15 Jun 84.

Reprint: Stimulated Emission Spectroscopy: A Complete Set of Vibrational Constants for X 1A1 Formaldehyde.

DESCRIPTORS: (U) \*Formaldehyde, \*Emission spectroscopy, Pumping, Vibrational spectra, Diatomic molecules, Polyatomic molecules, Reprints

IDENTIFIERS: (U) Stimulated emission pumping, PEB1102F, WUAFOSR2303B1

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DTIC REPORT BIBLIOGRAPHY		SEARCH CONTROL NO.	EVI198
AD-A144 347	20/8	20/10	AD-A144 348 7/4
CHICAGO UNIV IL JAMES FRANCK INST		VIRGINIA UNIV CHARLOTTESVILLE DEPT OF CHEMISTRY	
(U) Very Low Energy Collision Induced Vibrational Relaxation: An Overview,		(U) Excited-State Lifetime Measurements: Linearization of the Forster Equation by the Phase-Plane Method.	
83	31P	DEC 83	4P
PERSONAL AUTHORS:	Rice, S. A. ; Carjan, C. ;	PERSONAL AUTHORS:	Love, J. C. ; Demas, J. N. ;
CONTRACT NO.	F49620-83-C-0002	CONTRACT NO.	AFOSR-78-3590
PROJECT NO.	2303	PROJECT NO.	2303
TASK NO.	B1	TASK NO.	B2
MONITOR:	AFOSR	MONITOR:	AFOSR
	TR-84-0888		TR-84-0881

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Laser Chemistry, v2 p137-168 1983.

Reprint: Very Low Energy Collision Induced Vibrational Relaxation: An Overview.

DESCRIPTORS: (U) \*Particle collisions, \*Quantum theory, \*Molecular vibration, Low energy, Relaxation, Literature surveys, Reprints

IDENTIFIERS: (U) Overviews, PEG1102F, WUAFOSR2303B1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Review of Scientific Instruments, v54 n12 p1787-1789 Dec 83.

Reprint: Excited-State Lifetime Measurements: Linearization of the Forster Equation by the Phase-Plane Method.

DESCRIPTORS: (U) \*Molecules, \*Excitation, \*Fluorescence, \*Molecular states, Life span(Biology), Resonance, Luminescence, Reprints, Energy transfer, Reprints

IDENTIFIERS: (U) \*Forster equation, PEG1102F, WUAFOSR2303B2

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVI19B

AD-A144 345 3/2

ENVIRONMENTAL RESEARCH INST OF MICHIGAN ANN ARBOR

(U) Experimental Evidence of the Uniqueness of Phase Retrieval from Intensity Data.

84 13P

PERSONAL AUTHORS: Flanagan, J. R. :

REPORT NO. ERIN-181900-8-J

CONTRACT NO. F49620-82-K-0018

PROJECT NO. 2311

TASK NO. A1

MONITOR: AFOSR TR-84-0847

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Indirect Imaging, pg 9-109  
1984.

Reprint: Experimental Evidence of the Uniqueness of Phase Retrieval from Intensity Data.

DESCRIPTORS: (U) \*Radio astronomy, Phase control, Two dimensions, Intensity, Reprints

IDENTIFIERS: (U) Phase retrieval, PE81102F,  
WUAFOSR2311A1

AD-A144 328 20/7

OKLAHOMA STATE UNIV STILLWATER DEPT OF CHEMISTRY

(U) Theoretical Studies of Tunneling Processes in Three-Body Exchange Reactions of van der Waals Rare Gas Dimers.

APR 84 10P

PERSONAL AUTHORS: Turner, R. A.; Raff, L. M.; Thompson, D. L.

CONTRACT NO. AFOSR-82-0311

PROJECT NO. 2303

TASK NO. A2

MONITOR: AFOSR TR-84-0882

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v80 n7 p3189-3196 Apr 84.

Reprint: Theoretical Studies of Tunneling Processes in Three-Body Exchange Reactions of van der Waals Rare Gas Dimers.

DESCRIPTORS: (U) \*Tunneling, \*Dimers, \*Collisions, Rare gases, Theory, Exchange reactions, Reprints

IDENTIFIERS: (U) Van Der Waals complexes, WUAFOSR2303A2,  
PE81102F

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## UNCLASSIFIED

## DTIC REPORT BIBLIOGRAPHY

AD-A144 319

9/2

STANFORD UNIV CA DEPT OF COMPUTER SCIENCE

(U) Approaches for Updating Databases with Incomplete Information and Nulls.

APR 84

10P

PERSONAL AUTHORS: Keller, A. ; Wilkins, M. W. :

CONTRACT NO. N00039-82-G-0250, AFOSR-80-0212

PROJECT NO. 2304

TASK NO. A2

MONITOR: AFOSR  
TR-84-0382

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Presented at the IEEE Computer Data Engineering Conference Proceedings, Los Angeles, CA, Apr 84.

ABSTRACT: (U) In this paper we consider approaches to updating databases containing null values and incomplete information. Our approach distinguishes between modelling incompletely known worlds and modeling changes in these worlds. As an alternative to the open and closed world assumptions, we propose the modified closed world assumption. Along with the discussion of updating, we address some issues of refining incompletely specified information. (Author)

DESCRIPTIONS: (U) \*Data bases, \*Global, \*Models, Change detection, Deficiencies, Accuracy, Data processing

IDENTIFIERS: (U) MUAFOSR2304A2, PEB1102F

IAC DOCUMENT TYPE:

GACIAC - MICROFICHE --

IAC SUBJECT TERMS: G--(U)Gratings(spectra), Detection,

Coherence, Correlation techniques, Correlation, Photons,

Diffusers, Interferometry, Diffusion, Scattering, Far

field, Measurement, ;

## SEARCH CONTROL NO. EVI19B

AD-A144 318

12/1

20/6

ROCHESTER UNIV NY DEPT OF PHYSICS AND ASTRONOMY

(U) Detection of Gratings Hidden by Diffusers Using Intensity Interferometry.

APR 80

11P

PERSONAL AUTHORS: Newman, D. ; DaInty, J. C. :

CONTRACT NO. AFOSR-81-0003

PROJECT NO. 2311

TASK NO. A1

MONITOR: AFOSR  
TR-84-0849

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of the Optical Society of America A, v1 n4 p403-411 Apr 84.

Reprint: Detection of Gratings Hidden by Diffusers Using Intensity Interferometry.

DESCRIPTIONS: (U) \*Correlation techniques, \*Gratings(spectra), \*Detection, Coherence, Information processing, Photons, Diffusion, Interferometry, Reprints

IDENTIFIERS: (U) MUAFOSR2311A1, PEB1102F

IAC NO. GC-840822

IAC DOCUMENT TYPE:

GACIAC - MICROFICHE --

IAC SUBJECT TERMS: G--(U)Gratings(spectra), Detection, Coherence, Correlation techniques, Correlation, Photons, Diffusers, Interferometry, Diffusion, Scattering, Far field, Measurement, ;

UNCLASSIFIED

AD-A144 312	3/2	DTIC REPORT BIBLIOGRAPHY	SEARCH CONTROL NO. EVI19B
LOUISIANA STATE UNIV	BATON ROUGE DEPT OF PHYSICS AND ASTRONOMY	AD-A144 304	20/8
(U) The Elusive Variability of BD +10 deg 2179.			
34	4P	PERSONAL AUTHORS: Greller, A. D.; Drilling, J. S.; Schonbarter, O.	PERSONAL AUTHORS: Lee, Y. S.; Bartlett, R. J.
CONTRACT NO.	AFOSR-82-0192.	CONTRACT NO.	AFOSR-82-002B
PROJECT NO.	2301	PROJECT NO.	2301
TASK NO.	A2	TASK NO.	A4
MONITOR:	AFOSR TR-84-0844	MONITOR:	AFOSR TR-84-0844

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. In Jnl. of Chemical Physics, v80  
n9 p4371-4377, 1 May 84.

Reprint: A Study of Be2 with Many-Body Perturbation Theory and a Coupled-Cluster Method Including Triple Excitations.

DESCRIPTORS: (U) \*Excitation, \*Dimers, \*Perturbation theory, Beryllium, Clustering, Potential energy, Reprints

IDENTIFIERS: (U) Hydrogen-deficient stars, High speed photometry, PEG1102F, MUAFOSR2301A2

IDENTIFIERS: (U) PEG1102F, MUAFOSR2301A4

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	DTIC REPORT BIBLIOGRAPHY	SEARCH CONTROL NO. EVI19B
AD-A144 302	11/2      13/8      20/11	AD-A144 302      CONTINUED
<b>ROCKWELL INTERNATIONAL THOUSAND OAKS CA SCIENCE CENTER</b>	<b>*Strength(Mechanics), Fractography, Fracture(Mechanics), Reaction kinetics, Isostatic pressing, Cracks, Voids, Density, Stress-strain relations, Agglomerates, Mathematical models, Equations, Structural analysis, Aluminum, Oxygen, Zirconium, Microstructure, Defects(Materials), Surface active substances, Powder metallurgy</b>	
(U) <b>Strengthening and Strength Uniformity of Structural Ceramics.</b>		
<b>DESCRIPTIVE NOTE:</b> Annual rept. 1 Feb 83-31 Jan 84.		
APR 84	78P	IDENTIFIERS: (U) PEG1102F, MUAFOSR2308A2
<b>PERSONAL AUTHORS:</b> Lange, F. F. ;		
<b>REPORT NO.</b> SCS285.3AR		
<b>CONTRACT NO.</b> F49620-81-C-0038		
<b>PROJECT NO.</b> 2308		
<b>TASK NO.</b> A2		
<b>MONITOR:</b> AFOSR		
	TR-84-0808	

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) The goal of this work is to identify the processing flaws that limit the strength of sintered ceramics, and to engineer uniform microstructures which either eliminate or minimize the size of these processing flaws. During the first year, a major advance was made by uncovering the fact that agglomerates in powders produce crack-like voids that severely limit the strength of sintered ceramics. Crack-like voids produced by the differential sintering of agglomerates relative to their surrounding powder matrix can be the most detrimental strength degrading flaw in sintered ceramics. As detailed and summarized in the review prepared for a 1984 ASH Conference on Materials for Future Energy Systems, colloidal approaches to powder processing and consolidation can minimize the size of soft agglomerates (those that can be broken apart with surfactants) and hard agglomerates (eliminated by sedimentation or colloidal suspensions). Work has shown that the elimination of the large, soft agglomerates with surfactants increases the average strength of a transformation toughened Al2O3/30 v/o ZrO2 (2.8 v/o Y2O3) composite from 550 MPa (80,000 psi) to 930 MPa (135,000 psi).

**DESCRIPTORS:** (U) \*Ceramic materials, \*Sintering,

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DTIC REPORT BIBLIOGRAPHY

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SEARCH CONTROL NO. EVI19B

AD-A144 279 CONTINUED

CARNEGIE MELLON UNIV PITTSBURGH PA DEPT OF METALLURGICAL  
ENGINEERING AND MATERIALS SCIENCE

(U) Stress Corrosion Cracking of wrought and P/M High  
Strength Aluminum Alloys.

DESCRIPTIVE NOTE: Annual technical rept. 1 Jan-31 Dec 83.

MAR 84 12P

PERSONAL AUTHORS: Thompson, A. W.; Bernstein, I. M.;

REPORT NO. CMU-AFOSR-AL-7

CONTRACT NO. AFOSR-81-0041

PROJECT NO. 2308

TASK NO. A1

MONITOR: AFOSR  
TR-84-0013

## UNCLASSIFIED REPORT

ABSTRACT: (U) The combined results of the first three years of the program are presented, with emphasis on the stress corrosion cracking and hydrogen embrittlement of the PM 7090 Al alloy. Additional results on 7075 are also given. In particular, the role of temper and loading mode in susceptibility were examined for three test methods--time to failure of notched round bar specimens in a brine solution; straining electrode tests on notched round specimens under cathodic charging; and tensile tests on hydrogen pre-charged notched round specimens. These tests form the basis for an extensive, completed Ph.D. thesis which is summarized here. Stress corrosion testing has also been conducted on 7075 in aluminum chloride solutions and on HP 7075. We remain confident that we have established the basis and a good portion of the results necessary to understand, predict and model the role of hydrogen in stress corrosion cracking of high-strength aluminum alloys.

DESCRIPTORS: (U) \*Aluminum alloys, \*stress corrosion,

\*Cracks, High strength alloys, Powder metallurgy,

Hydrogen embrittlement, Loads (Mechanics),

Cracking (fracturing), Strain(Mechanics), Aging(Materials),

Tensile strength, Electrodes, Tensile testers

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## UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY		SEARCH CONTROL NO. EVI19B	
AD-A144 248	20/3	20/12	AD-A144 239 12/1 20/6
STANFORD UNIV CA EDWARD L GINZTON LAB OF PHYSICS		NEW MEXICO UNIV ALBUQUERQUE DEPT OF MATHEMATICS AND STATISTICS	
(U) A 15 Nb-Sn Tunnel Junction Fabrication and Properties, MAY 84 12P		(U) Minigrant Program. A Differential Geometric Approach to Electromagnetic Lens Design.	
PERSONAL AUTHORS: Rudman, D. A.; Holloman, F. ; Hammond, R. H.; Beasley, M. R. ;		DESCRIPTIVE NOTE: Final rept. 16 May 83-15 May 84.	
REPORT ND.	CA-3670	JUN 84	SP
CONTRACT ND.	F49620-82-C-0014	PERSONAL AUTHORS:	Stone, A. P. ;
PROJECT ND.	2301	REPORT NO.	NOTE-282
TASK ND.	A8	CONTRACT ND.	AFOSR-83-0040
MONITOR:	AFOSR TR-84-0629	PROJECT NO.	2304
		TASK NO.	D9
		MONITOR:	AFOSR TR-84-0598
UNCLASSIFIED REPORT			
SUPPLEMENTARY NOTE: Pub. in Jnl. of Applied Physics, v55 n10 p3544-3553, 15 May 84.			
Reprint: A 15 Nb-Sn Tunnel Junction Fabrication and Properties.			
DESCRIPTORS: (U) *Tunneling(Electronics); *Superconductors; *Junctions; *Niobium alloys; *Tin alloys; Electron beams; Deposition; Reprints			
IDENTIFIERS: (U) PE81102F, WUAFOSR2301A8			
ABSTRACT: (U) The problems investigated under this minigrant arose in the author's research on electromagnetic (EM) lens design. This research was concerned with an EM lens design technique developed by C. E. Baum for transitioning TEM waves between cylindrical and conical transmission lines.			
DESCRIPTORS: (U) *Experimental design, *Lenses, *Electromagnetism, *Geometry, Approach, Maxwell's equations, Shape, Parameters, Transmission lines			
IDENTIFIERS: (U) *Electromagnetic lens, PE81102F, WUAFOSR2304D9			

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SEARCH CONTROL NO. EVI19B

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STANFORD UNIV CA EDWARD L GINZTON LAB OF PHYSICS

(U) NbZr Multilayers. I. Structure and Superconductivity.  
MAY 84 10P

PERSONAL AUTHOR(S): Low, M. P.; Geballe, T. H. ;  
REPORT NO.: GL-3887

CONTRACT NO.: F49620-82-C-0014  
PROJECT NO.: 2301

TASK NO.: A8

MONITOR: AFOSR  
TR-84-0828

**UNCLASSIFIED REPORT**

SUPPLEMENTARY NOTE: Pub. In Physical Review B, v29 n9  
p4961-4968, 1 May 84.

Reprint: NbZr Multilayers. I. Structure and  
Superconductivity.

DESCRIPTORS: (U) \*Superconductors, \*Sputtering, Crystal  
structure, Niobium alloys, Zirconium alloys, Layers,  
Reprints

IDENTIFIERS: (U) PE81102F, MUAFUSR2301A8

**UNCLASSIFIED REPORT**

ABSTRACT: (U) Research was performed during this period  
in four separate areas: Deformation of Solids and  
Stochastic Flows; Self-Exciting Point Processes;  
Stability of Dependent Random Variables; and Brownian  
Motion on Manifolds. This report summarizes progress in  
these areas. (Author)

DESCRIPTORS: (U) \*Markov processes, \*Microcracking,  
\*Mathematical Models, Research management, Continuum  
mechanics, Deformation, Solids, Flow, Excitation,  
Points (Mathematics), Random variables, Brownian motion,  
Nucleation, Control, Replacement, Signals

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVI19B

AD-A144 217 12/1

AD-A144 217 CONTINUED

CALIFORNIA UNIV LOS ANGELES DEPT OF MATHEMATICS

(U) Spline and Weighted Random Directions Method for Nonlinear Optimization.

DESCRIPTIVE NOTE: Technical rept..

84 1SP

PERSONAL AUTHORS: Milstein, J. ;

CONTRACT NO. AFOSR-80-0243

PROJECT NO. 2304

TASK NO. A3

MONITOR: AFOSR TR-84-0582

UNCLASSIFIED REPORT

ABSTRACT: (U) This article considers the problem of determining the optimal value and corresponding optimal point of a real function  $F$  in  $N$  variables. Only function values are given and the computation of derivatives is either not practical or are not available. Bremermann introduced an ingenious and useful optimization algorithm that is guaranteed to converge for polynomials in several variables up to fourth degree. The heart of this method is the use of random directions of search together with a Lagrangian interpolation scheme. This author, having had extensive experience with this algorithm, found that the method has fast convergence at the early stages and tends to stagnate in the neighborhood of the optimal point. Motivated by the usefulness of random directions it is the purpose of this article to present an algorithm based on the proper use of interpolation schemes; (a) Lagrangian Interpolations (such as those in Bremermann's methods); (b) spline approximations with variable nodes; (c) pseudo Newton steps using the spline derivatives (not the function); together with a search procedure along weighted random directions. The directions are chosen to be orthogonal using the Gram Schmidt orthogonalization procedure. This algorithm was extensively used for problem solving in mathematical biology, chemical kinetics, and general dynamical systems.

DESCRIPTORS: (U) \*Lagrangian functions, \*Variables,

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## DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI19B

AD-A144 216 20/3 9/2  
 KENTUCKY UNIV RESEARCH FOUNDATION LEXINGTON  
 (U) Harmonic Control to Reduce Torque Pulsations in  
 Brushless DC Motor Drives.

DESCRIPTIVE NOTE: Final rept. May 83-Jan 84.

MAR 84 145P

PERSONAL AUTHORS: Cathay, J. J. :

CONTRACT NO. AFOSR-83-0189

PROJECT NO. 2305

TASK NO. D9

MONITOR: AFOSR TR-84-0807

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) The brushless direct current (DC) machine theoretically offers wide speed range torque characteristics like unto the commutator DC machine. However, in brushless DC motor drive systems there exists a performance deficiency in that at near zero speeds driven mechanical loads can respond to the pulsating component of developed torque when simple rotor position activated switching is utilized. This report analytically develops a pulse width modulation control philosophy that reduces torque pulsations to an acceptable level. (Author)

**DESCRIPTORS:** (U) \*Brushless electric equipment, \*Torque, \*Control systems, \*Pulse position modulation, \*Computer programs, Direct current, Motors, Reduction, Deficiencies, Phase modulation, Air Force research

**IDENTIFIERS:** (U) \*Torque pulsations, Cyclococonverter drives, Harmonic control, PEG1102F, MUAFOSR2305A2

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. In Jnl. of Acoustical Society of America, v75 n3 p885-881 Mar 84.

Reprint: A Unified Theory for Elastic Wave Propagation in Polycrystalline Materials.

**DESCRIPTORS:** (U) \*Elastic waves, \*Acoustic waves, \*Wave propagation, Theory, Polycrystalline, Attenuation, Acoustic attenuation, Reprints

**IDENTIFIERS:** (U) PEG1102F, MUAFOSR2305A2

DESCRIPTIVE NOTE: Interim rept. Jul 82-Jul 83.

MAR 84 19P

PERSONAL AUTHORS: Starke, F. E.; Kino, G. S. :

REPORT NO. GL-3595

CONTRACT NO. F49620-79-C-0217

PROJECT NO. 2308

TASK NO. A2

MONITOR: AFOSR TR-84-0831

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. In Jnl. of Acoustical Society of America, v75 n3 p885-881 Mar 84.

Reprint: A Unified Theory for Elastic Wave Propagation in Polycrystalline Materials.

**DESCRIPTORS:** (U) \*Elastic waves, \*Acoustic waves, \*Wave propagation, Theory, Polycrystalline, Attenuation, Acoustic attenuation, Reprints

**IDENTIFIERS:** (U) PEG1102F, MUAFOSR2305A2

## UNCLASSIFIED

## DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI19B

AD-A144 194 11/8 20/11

SOLAR TURBINES INC SAN DIEGO CA

(U) Erosion Mechanisms of Metals.

DESCRIPTIVE NOTE: Final rept. Jul 78-Aug 83.

MAR 84 10SP

PERSONAL AUTHORS: Guiden, M. E. ; Kubarych, K. G. ;

REPORT NO. SR84-R-4526-03

CONTRACT NO. F49620-78-C-0104

PROJECT NO. 2308

TASK NO. A2

MONITOR: AFOSR

TR-84-0833

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) This final report summarizes the experimental approach was to initially study a single alloy which exhibits a transition from brittle to ductile type erosion response at room temperature. At a later stage, the dynamic hardness of several substrate materials, both pure metals and alloys, was measured in order to provide a material property obtained under dynamic conditions similar to those during an actual erosion event. The results can be conveniently separated into two phases as follows: Erosion Material Removal Mechanisms, and Correlation Between Dynamic Hardness and Erosion.

**DESCRIPTORS:** (U) \*Metals, \*Carbon steels, \*Erosion, Fracture(Mechanics), \*Brittleness, Microstructure, Strain rate, Stress strain relations, Plastic deformation, Hardness, Ductility, Melting point, Mechanical properties, Heat treatment, Substrates, Aluminum alloys, Copper, Gold, Polycrystalline alloys, Particle size

**IDENTIFIERS:** (U) Aluminum 2024, Steel 1095, MAUTSR2308A2, PEB1102F

## DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI19B

AD-A144 192 20/8

LA JOLLA INST CA

(U) Low-Energy Collisions Excited Atoms.

DESCRIPTIVE NOTE: Final rept. 1 May 82-30 Apr 84.

JUN 84 11P

PERSONAL AUTHORS: Neynaber, R. H. ; Tang, S. Y. ;

CONTRACT NO. F49620-82-K-0023

PROJECT NO. 2301

TASK NO. A4

MONITOR: AFOSR

TR-84-0820

## UNCLASSIFIED REPORT

## UNCLASSIFIED REPORT

**ABSTRACT:** (U) The report describes molecular-beam studies of ion-pair production, charge transfer, and measurements of the fraction of excited Na atoms in a composite beam of ground-state and excited Na atoms. Some of the experiments involved laser excited Na as a reactant. Included are investigations of the Na-Br, doubly charged Ar-Ar, Ne ion-metastable He, excited Na-Na, and Li-Na systems.

**DESCRIPTORS:** (U) \*Collisions, \*Excitation, \*Atoms, \*Low energy, Lasers, Charge transfer, Molecular beams, Pair production, Ions, Sodium, Argon, Lithium, Neon, Bromine

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	DTIC REPORT BIBLIOGRAPHY	SEARCH CONTROL NO.	EVI19B
AD-A144 184	12/1	8/1	AD-A144 181
UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF MATHEMATICS			12/1
(U) Mathematical Biology. Models and Algorithms.			5/1
83	SP	JUN 84	SP
PERSONAL AUTHORS:	Milstein, J. ;	PERSONAL AUTHORS:	Milner, B. L. ;
CONTRACT NO.	AFOSR-80-0243	CONTRACT NO.	AFOSR-82-0305
PROJECT NO.	2304	PROJECT NO.	2304
TASK NO.	A3	TASK NO.	A8
MONITOR:	AFOSR TR-84-0594	MONITOR:	AFOSR TR-84-0590

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. In Modelling and Data Analysis in Biotechnology and Medical Engineering, p73-78 1983.

Reprint: Mathematical Biology. Models and Algorithms.

DESCRIPTORS: (U) \*Mathematical models, \*Mathematical analysis, \*Algorithms, Biology, Kinetics, Vector analysis, Parameters, Predictions, Standardization, Reprints

IDENTIFIERS: (U) \*Mathematical biology. MUAFOSR2304A3, PEG1102F

## UNCLASSIFIED REPORT

ABSTRACT: (U) Investigators studied the problem of the order in which to inspect a system to determine its state and the cause of its possible failure. Results to date are for a series system, and k types of inspections, k > 1. This generalizes the direct search results of Matula and Stone where k is fixed at 1. The model also allows multiple inspections in the same period. (Author)

DESCRIPTORS: (U) \*Mathematical models, \*Systems analysis, \*Reliability, Searching, Decision making, Failure, Sequences, Bayes theorem

IDENTIFIERS: (U) MUAFOSR2304A8, PEG1102F

## UNCLASSIFIED

## DTIC REPORT BIBLIOGRAPHY

AD-A144 148 7/4

CALIFORNIA UNIV SANTA BARBARA DEPT OF CHEMISTRY

(U) Electrode Reactions of Oriented Chemisorbed Molecules.  
The Effect of Temperature on Reversible Redox,  
Irreversible Oxidation, and Reductive Desulfurization.

83 17P

PERSONAL AUTHORS: Soriano, M. P.; Hubbard, A. T. ;

CONTRACT NO. AFOSR-81-0149

PROJECT NO. 2303

TASK NO. A1

MONITOR: AFOSR

TR-84-0319

## UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. In Jnl. of Electroanal Chemistry.  
v159 p101-116 1983.

Reprint: Electrode Reactions of Oriented Chemisorbed  
Molecules. The Effect of Temperature on Reversible Redox,  
Irreversible Oxidation, and Reductive Desulfurization.

DESCRIPTIONS: (U) \*Electrochemistry, Chemical reactions,  
Electrodes, Chemisorption, Orientation(Direction),  
Temperature, Aromatic compounds, Reprints

IDENTIFIERS: (U) PEE1102F, MUAFOSR2303A1

## SEARCH CONTROL NO. EVI19B

AD-A144 144 5/1 5/9 14/2

SOUTHEASTERN CENTER FOR ELECTRICAL ENGINEERING EDUCATION  
INC ST CLOUD FL

(U) United States Air Force Geophysics Scholar Program.  
1982-1983.

DESCRIPTIVE NOTE: Management and technical rept..

MAR 84 252P

PERSONAL AUTHORS: Peale, W. D.; Steele, E. L.; Stair, A. T. ;

CONTRACT NO. F49620-82-C-0035

PROJECT NO. 2301

TASK NO. D5

MONITOR: AFOSR  
TR-84-0822

## UNCLASSIFIED REPORT

ABSTRACT: (U) The Geophysics Scholar Program was initiated as a pilot program to provide new Research Scholars with one year appointments to the Air Force Geophysics Laboratory. Extensive mailings were made to technical departments at universities around the United States where programs of prime interest to the Geophysics Laboratory were established. These included Atmospheric Studies, Geophysics, Meteorology and related applied sciences. Ten Scholars were appointed beginning in September 1982 and extending through December 1982, for 12 months duration. Six of these were subsequently continued in the Geophysics Scholar Program under another contract for a second year. Five technical papers were presented by the Scholars during the year. The final technical reports on the Scholar's work are included in this report. This pilot program was judged to a success by both the Scholars and their Laboratory Associates. Their comments were solicited by questionnaire and are included. The Scholars were judged to be beneficial to the laboratory. The opportunity of having new Research people on a short term basis was felt to be very stimulating and worth while. Their interaction with the Laboratory was very positive. At the initiation of this program, travel funds were provided only for travel to the Laboratory site at the state of the appointment and return funds at the end. Some difficulties were

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EV119B

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subsequently encountered in transferring funds and authorizing travel to technical meetings. This caused some distress among the scholars. However, overall, the scholars felt their experience at the Laboratory were constructive steps in their professional development.  
(Author)

DESCRIPTORS: (U) \*Research management, \*Geophysics, Laboratories, \*Education, Students, Universities, Pilot studies

IDENTIFIERS: (U) PEB1102F, WUAFOSR2301DS

AD-A144 142 20/6

MICHIGAN UNIV ANN ARBOR DEPT OF ELECTRICAL AND COMPUTER ENGINEERING

(U) White Light Optical Information Processing.

DESCRIPTIVE NOTE: Annual rept. no. 6. 15 Aug 82-30 Sep 83.

FEB 84 41P

PERSONAL AUTHORS: Leith, E. N. :

CONTRACT NO. AFOSR-81-0243

PROJECT NO. 2305

TASK NO. B1

MONITOR: AFOSR  
TR-84-0608

## UNCLASSIFIED REPORT

ABSTRACT: (U) Methods for optical processing and holography with light of reduced coherence are described. Specifically described are: (a) a method for making holographic optical elements in light of reduced spatial coherence; (b) a method for doing real time phase conjugation in light of reduced spatial coherence; and (c) a method for doing off-axis Fourier transform holography in spatially incoherent light. (Author)

DESCRIPTORS: (U) \*Optical processing, \*Information processing, \*White light, Fourier transformation, Holography, Signal to noise ratio, Coherence, Incoherence, Interferometry, Air Force research

IDENTIFIERS: (U) PEB1102F, WUAFOSR2305S1

IAC NO. NT-029798

IAC DOCUMENT TYPE: NTIAC - MICROFICHE --

IAC SUBJECT TERMS: N--(U)HOLOGRAPHY, OPTICAL PROCESSING, INCOHERENT LIGHT, ROBOTICS, VISION, IMAGE PROCESSING, OPTICAL ELEMENTS, REAL TIME, PHASE, COHERENCE, CONSTRUCTION, GRATINGS, INTERFEROMETRY, COMPARISON, IMAGING TECHNIQUES, RESOLUTION;

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVI198  
AD-A144 137 20/3

NEW MEXICO UNIV ALBUQUERQUE DEPT OF MATHEMATICS AND  
STATISTICS

(U) An Anisotropic Lens for Launching TEM Waves on a  
Conducting Circular Conical System.

JUN 84 84P

PERSONAL AUTHORS: Stone, A. P.; Baum, C. E. ;

REPORT NO. NOTE-285

CONTRACT NO. AFOSR-83-0040

PROJECT NO. 2304

TASK NO. D9

MONITOR: AFOSR  
TR-84-0800

UNCLASSIFIED REPORT

ABSTRACT: (U) A differential impedance and transmittime matching approach is used in the design of an anisotropic lens for launching TEM waves from a small source, through the lens, and onto a conducting circular conical system. This approach leads to a system of ordinary differential equations which may be solved exactly to obtain the lens parameters. An approximate solution, which would be applicable to a design procedure, is also given. (Author)

DESCRIPTORS: (U) Numerical methods and procedures, Lenses, anisotropy, Circular, Conical bodies, Equations, Impedance matching, Launching, Geometry, Parameters, Solutions (General), Graphs, Tables (data)

IDENTIFIERS: (U) PEG1102F, MUAFOSR230408  
PES1102F, MUAFOSR230408

MASSACHUSETTS INST OF TECH CAMBRIDGE FRANCIS BITTER  
NATIONAL MAGNET LAB

(U) Synthesis and Characterization of Superconducting  
Electronic Materials.

DESCRIPTIVE NOTE: Semianual technical rept. 1 Jul-31 Dec  
83.

PERSONAL AUTHORS: Maservay, R. H.; Tedrow, P. M.; Orlando, T.  
P. J.

FEB 84 SP

CONTRACT NO. F49620-82-K-0028

PROJECT NO. 2308

TASK NO. C1

MONITOR: AFOSR

TR-84-0830

UNCLASSIFIED REPORT

ABSTRACT: (U) Films of WN as thin as 5 nm have been made by nitriding V films at high temperature. Tunnel junctions have been successfully made using both oxidized and nitrided amorphous Si barriers. Spin-polarized tunnelling results show WN to have a small spin-orbit interaction, but larger than Al. Tunnel junctions have been successfully made on V3Ga and spin-polarized tunnelling shows spin splitting up to 20 Teslas. Structure and compositional analysis of the V3Ga films has been carried out. We have successfully made high transition temperature Nb films as thin as 5 nm.

DESCRIPTORS: (U) Superconductors, Nitrides, Vanadium compounds, Synthesis (Chemistry), Thin films, High temperature, Tunnelling (Electronics), Junctions, Silicon, No peculiar orbitals, Spinning (Motion), Orbitals  
IDENTIFIERS: (U) PEG1102F, MUAFOSR2308C1

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVI188

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BATTELLE COLUMBUS LABS OH

(U) Hot Isostatic Pressing of Ceramic Powder Compacts.

DESCRIPTIVE NOTE: Rept. no. 2, Jun 83-Jun 84.

JUN 14 71P

PERSONAL AUTHORS: MCCOY, J. K.; WILLIS, R. R. ;

CONTRACT NO. AFOSR-82-0238

PROJECT NO. 2308

TASK NO. B2

MONITOR: AFOSR  
TR-84-0817

UNCLASSIFIED REPORT

ABSTRACT: (U) The effect of temperature, pressure and time on the rate of densification of submicron alumina powder during hot isostatic pressing has been determined using a dilatometer to continuously monitor volumetric changes. A Fortran computer program is used to make corrections for thermal expansion of the alumina and the stainless steel can, to determine the relative density of the alumina compact at any point, and to produce report ready graphs depicting the relationship between any two prescribed variables. Analysis of other errors associated with the use of the dilatometer shows that these are negligible compared with thermal expansion effects. The rate of densification is controlled by an interface reaction mechanism never previously observed in the densification of alumina. Mass transport is limited by the movement of grain boundary dislocations which act as sites for atoms to detach from grains. The actual rate limiting process is the diffusion of solute in the lattice since the motion of solute atoms can result in a large number of atoms being freed from a grain boundary dislocation. Once separated from the dislocation the atoms quickly diffuse away.

DESCRIPTORS: (U) \*Ceramic materials, \*Isostatic pressing, \*Packing density, Powders, Aluminum oxides, Stainless steel, Hot pressing, Diffusion coefficient, Porosity, grain size, Dislocations, Physical properties, Mechanical properties, Thermal expansion, Algorithms, Mathematical

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models, Theory, Test methods, Computer programs, Variables, Interfaces, Graphs.

IDENTIFIERS: (U) PEG1102F, MUAROSR2308B2

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DTIC REPORT BIBLIOGRAPHY		SEARCH CONTROL NO. EVI198
AD-A144 122	21/2	AD-A144 121 12/1
CLARKSON COLL OF TECHNOLOGY POTSDAM NY DEPT OF PHYSICS		LA JOLLA INST CA CENTER FOR THE STUDY OF NONLINEAR DYNAMICS
(U) Advanced Studies of Integrable Systems.		(U) The Analytic Structure of Ordinary and Partial Differential Equation.
DESCRIPTIVE NOTE: Interim rept., 8 Jan 83-31 May 84.		DESCRIPTIVE NOTE: Final rept. 1 Mar 83-28 Feb 84.
JUN 84 25P		MAY 84 12P
PERSONAL AUTHORS: Kaup, D. J. :		PERSONAL AUTHORS: Weiss, J. :
CONTRACT NO. AFOSR-82-0154		REPORT NO. LJI-R-84-281
PROJECT NO. 2304		CONTRACT NO. AFOSR-83-0095
TASK NO. A4		PROJECT NO. 2304
MONITOR: AFOSR TR-84-0593		TASK NO. A4
UNCLASSIFIED REPORT		
ABSTRACT: (U) A scientific report is presented covering publications resulting from a one year study of advanced topics in integrable systems. These publications cover studies on: Soliton Dynamics in the Presence of External Forces; Nonlinear Scattering of Whistlers by Electro-Static Fluctuations; The Force Toda Lattice: An example of an almost integrable system; The Soliton Birth Rate in the Forced Toda Lattice; and Whistler Scattering From Density Fluctuations in Magnetized Plasmas. (Author)		
DESCRIPTIONS: (U) *Integrated systems, *Physics, Whistlers, Scattering, Nonlinear systems, Electrostatics, Magnetization, Plasmas(Physics), Density, Variations		
IDENTIFIERS: (U) Solitons, PEG1102F, WUAFOSR2304A4		
IDENTIFIERS: (U) Sine Gordon equations, Painleve property, Bousinesq equations, Backlund transformations, PEG1102F, WUAFOSR2304A4		
DESCRIPTORS: (U) *Partial differential equations, Numerical methods and procedures, Solutions(General), Transformations(Mathematics), Linearity, Air Force research		
IDENTIFIERS: (U) Sine Gordon equations, Painleve property, Bousinesq equations, Backlund transformations,		

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